

YALE UNIVERSITY
DEC 27 1928
LIBRARY.

THE FAR EASTERN REVIEW

ENGINEERING FINANCE COMMERCE

Hoover in China

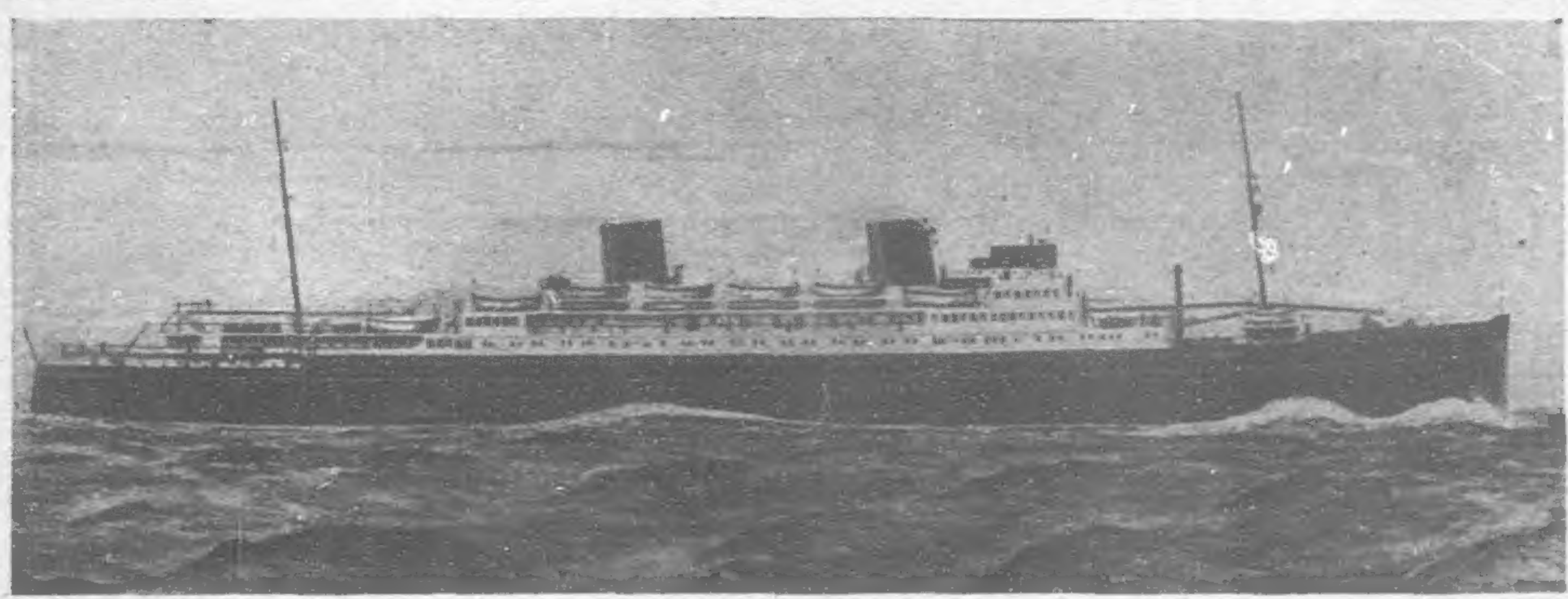
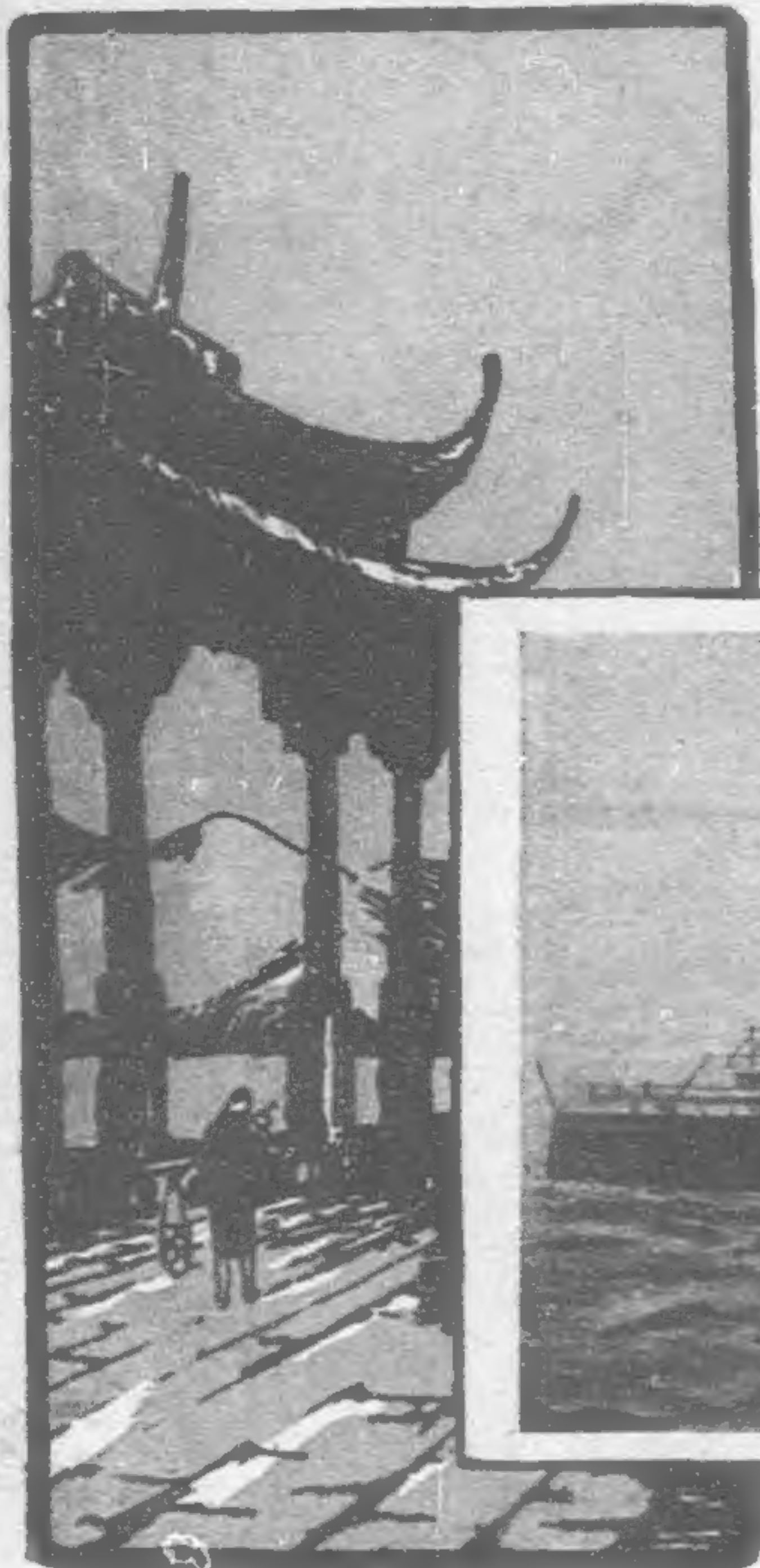
上海仁記路拾六號

遠東時報

Vol. XXIV November, 1928 No. 11

SHANGHAI, PEKING, TOKYO AND MANILA

New Era Dawning in Trans-Pacific Travel



One of the Transcendent Trans-Pacific Trio ordered by the N. Y. K. Line to be commissioned in their Orient-California Fortnightly Service in 1929.

Details of the Transcendent Trio:

Quadruple Screw Motor-driven Passenger Liners.

Tonnage	...	...	...	...	...	16,500 gross tons, 22,000 displacement tons
Length	...	...	...	...	...	560 feet
Speed	...	...	...	...	...	19 knots

These vessels will embody the highest ideal of a passenger carrier and are expected to revolutionize the passenger traffic on the Pacific.

Principal Passenger Services in operation:—

To North America

Orient—California, Fortnightly Service.
Orient—Seattle Service, Fortnightly Sailings.

To South America

Orient—South American West Coast Service, approx. Monthly Sailing.
Orient—South American East Coast Service, approx. Monthly Service.

To Europe

Japan—Europe Fortnightly Service.

To Australia

Japan—Australia Monthly Service

To Bombay

Japan—Bombay Monthly Service.

To Japan

China—Japan Rapid Express Service, sailings every four days.
Tsingtao—Japan Semi-monthly Service, etc., etc.

For information, please apply to

Shanghai
31 The Bund

Tsingtao
20 Kuan Tau Road

Tientsin
K. Y. K. Line,
French Concession

Hongkong
King's Building,
8, Connaught Road

N. Y. K. LINE

Head Office: Yusen Building, Tokyo

The Far Eastern Review

ENGINEERING

FINANCE

COMMERCE

VOL. XXIV

SHANGHAI, NOVEMBER, 1928

No. 11

The Enthronement of the Japanese Emperor



ANY explanations have been offered for Japan's phenomenal position among the nations of Asia. The fact remains that in a period of approximately fifty years, Japan, which had been isolated and backward, achieved greatness in the family of nations equal only to the

United States, Great Britain, France and Italy. In a word, out of the welter of the Great War, Japan arose as one of the five great powers of the earth. Small in territory, small in population, with few natural resources, Japan to-day is the foremost Asiatic power and one of the great industrial nations of the earth.

There can be no single cause to explain this unusual historical phenomenon, but the enthronement of a new Emperor for Japan cannot but lead one to consider the relationship for the Imperial family to Japan's progress. In most countries, progress has been from below, that is, masses rebelled against those who were keeping the country backward and after bloodshed and strife and revolution and the suffering of the people, tremendous developments took place which led the nation to greatness.

In Japan, no such cataclysm occurred. The Emperor Meiji surrounded himself with the most brilliant young men of Japan, announced that the country was entering upon a new era, sent his more talented subjects to western countries to discover the processes by which the

West had achieved prosperity and happiness, brought to Japan capable Westerners to train the Japanese in the arts of production, reorganized industry and commerce on a modern basis and started his country upon a career which could not but have resulted in the present era of prosperity, stability and peace.

Perhaps few documents in history so clearly set forth the guiding principle of a nation than the CHARTER OATH which the Meiji Emperor took at the Sanctuary in the Imperial Palace on February 11, 1889.

We, the successors to the prosperous Throne of Our predecessors, do humbly and solemnly swear to the Imperial Founder of our House and to Our other Imperial ancestors, that, in pursuance of a great policy co-extensive with the heavens and with earth, We shall maintain and secure from decline the ancient form of government.

In consideration of the progressive tendency of the course of human affairs, and in parallel with the advance of civilization, We deem it expedient, in order to give clearness and distinctness to the instructions bequeathed by the Imperial Founder of Our House and by Our other Imperial ancestors, to establish fundamental laws formulated into express provisions of

(Continued on page 498).



EMPEROR OF JAPAN

HOOVER IN CHINA

The Story of the Kaiping Mining Deal

By Geo. Bronson Rea

HERBERT HOOVER is the President-Elect of the United States, the highest honor that his fellow countrymen, proud of his record and achievements, can bestow upon him. During the pre-convention months a vigorous campaign was waged to prevent his nomination. His political opponents combed the world for evidence that could be used against him. They dug up the old Kaiping Mining deal and tried to fasten on Hoover the charge that he had double-crossed the Chinese and sold them out. The records of the trial for the recovery of administrative control over the properties held in London in 1905, were reprinted and the decision of the British judge presiding at the trial reproduced in the "Congressional Record." The evidence was twisted and distorted in order to make out a case that would stop Hoover at Kansas City. The following story was written last March and has been held in Washington for release in the event that the truth about the Kaiping deal was considered of sufficient importance to counteract the reports, then in circulation. The facts outlined below are as near to the truth as it is possible to arrive at after a lapse of twenty-eight years.

The story of the Kaiping Mines is essentially a China story, of immediate interest to the Chinese themselves who are now planning to exercise their right to take over the properties as soon as their finances will permit. The Chinese are looking forward with hope and confidence that American capital will come to their immediate assistance in the rehabilitation and reconstruction of their ruined country. They believe that Herbert Hoover is their friend and will help them. They are right. Hoover is a friend of China. No man in the United States has a better appreciation and knowledge of the wonderful opportunities for development offered by this country. Hoover knows the Chinese, but labors under no illusions about their ability and capacity to manage large undertakings.

PREWORD: In the heat of the intense pre-convention campaign, the old story of Secretary Hoover's connection with the transfer of the original Chinese Engineering & Mining Company's properties to British registry is being dragged into the limelight of politics in an attempt to prevent his nomination. The story goes back to the exciting days of the Boxer Rebellion when the massacre of missionaries and the attacks on the Legations, staggered the civilized world and brought about immediate reprisals by the armed forces of all the Powers. The report of the trial for the recovery of control over the property before the High Court of Equity in London and the subsequent decision of the Court of Appeals was published in the London and China newspapers of that date. The Memorials to the Throne, the Imperial Mandates and other Chinese official correspondence and documents bearing on their side of the case, together with the reports of the public meetings of the shareholders called to protest against the transfer are reported at length in the Tientsin, Shanghai and Hongkong newspapers.

The story in a garbled form was given publicity in a Washington political weekly on February 25 and reprinted by various newspapers throughout the country. This version, however, was based solely on the reports of the case tried before the High Court of Equity in London in 1905 and the decision handed down by Justice Joyce. Senator Overman (Democrat) of North Carolina took occasion to have a copy of this article together with the full text of Justice Joyce's decision reprinted in the *Congressional Record*.

This elicited a prompt reply from Secretary Hoover's friends. Senator Lenroot of Wisconsin, who went over all the evidence in the case, wrote a letter to Congressman Free of California, reviewing the legal aspects of the case and exonerating Mr. Hoover from any improper connection with the deal, a conclusion eminently justified by the facts. This was also reprinted in the *Congressional Record* and supplemented by a letter of the same nature from Baron de Cartier, former Belgian Ambassador in Washington and, during the Boxer Rebellion and the years immediately following, Belgian Chargé de Affaires in Peking.

The controversy reopens one of the most spectacular international questions connected with the alienation of Chinese sovereignty and control of the most valuable and extensive coal fields in the country, together with the possession of an ice-free, strategic port in the Gulf of Chihli; a deal that was put through when China was at war with the world in order to preserve the properties from confiscation as spoils of war by one of the hostile nations whose armed forces then occupied the property.

The Kaiping story is far from being dead. It is very much alive and will again come up for consideration when the Chinese are in a position to exercise their rights under the Kailan Agreement of 1912 to purchase the Kaiping properties at a price to be agreed upon between them and the British shareholders. In view of all the facts in the case, involving the standing of the lone American who participated in the deal, it is better for the nation and for Mr. Hoover himself that the facts are presented at this time rather than invite their rehearsal at some future date from unfriendly Chinese or European sources.

* * *

The Background of the Story

The story of international finance in China is one long record of double crossing, bad-faith and political intrigue so interwoven with European diplomacy of the old school, that it is impossible to dissociate one from the other. With few exceptions, every financial group that has operated in China has been in some manner the instrument to promote the special interests of its government. China's own tortuous diplomacy was responsible in large part for this close alliance between European finance and politics. Little by little the truth surrounding the events of the early part of the century has been revealed; a fact here, a document there, an admission in some biography, the memoirs of some statesman or financier, together with the publication of official records, have all contributed to clarify a situation that confused the most expert

investigators. The record is still far from complete. All the ramifications of the celebrated deal which converted the old Chinese Engineering & Mining Company into an Anglo-Belgian enterprise will never be revealed until the secret archives of the British and Belgian governments are opened to the historians. The main facts, however, are on record. The legal side of the case was taken to the highest court of appeal in England and the promoters absolved from any financial wrong-doing. That verdict stands. Whatever claim for damages the British courts conceded to the Chinese has since been settled. That part of the slate is wiped clean.

Russia and Her Allies

Then, as now, the disturbing factor in world politics, was Russia. The storm center lay in Central Asia, where Russia was frantically building strategic railways and pushing her outposts up to the frontiers of Afghanistan with the determination of forcing an issue with England over the possession of India. Blocked at every step in her plans to invade India from the north and northwest, Russia suddenly changed her tactics and started to clear a way for her armies to reach their objective from the northeast. To do this, she had to dominate China and create a path through Chinese territory. Russia's program of conquest by railway by means of which she had ruthlessly brought all of Central Asia under subjection, was then extended eastwards towards the Pacific. These schemes called for enormous amounts of money which Russia at the time could not supply. Her French ally supplied this deficiency and supported the program at all times with her own diplomacy and schemes to harass Great Britain on her Burma borders. When it was considered too dangerous for either of these two great powers to disclose their hand, the execution of the plan was entrusted to Belgium, which obtained the coveted concessions and financed them with French money.

"The Partition of China"

The plans of Russia were made possible only by the terms of the secret treaty of alliance entered into with China in May, 1896. This agreement let Russia into Manchuria, and two years later brought her to the tip of the Liao-tung peninsula and the control of an ice-free, deep-water port, enabling her for the first time to challenge British naval supremacy in the Pacific. Every forward step by Russia in the north was followed by a corresponding advance of her French ally in the south. Every move made by Belgium dovetailed into the Franco-Russian scheme of conquest.

So we come to 1900 and the Boxer Rebellion. This was Russia's opportunity. She flooded Manchuria with her armies, closed it to foreign commerce, converted it into a viceroyalty and commenced to place in execution her carefully prepared plans to annex

not only The Three Eastern provinces but the whole of North China as well. One of her first acts was to seize the Imperial Railways of North China, hypothecated to British bond-holders, eject the British engineer-in-chief and his staff in violation of the loan agreement, and place the line and its operation under Russian military direction. By July 8, the line was completely under Russian domination. In view of their strong position, the council of admirals, headed by Admiral Seymour, decided on July 17, that the line between Taku and Tientsin should be managed and guarded by the Russians, then in possession. At the same time, however, the British Government warned St. Petersburg that it must be clearly understood that the railway would revert to its former status on the termination of hostilities.

The Russians then seized and hoisted their flag over the properties of the Chinese Engineering & Mining Company, ousted the foreign staff, stopped mining operations and prohibited the further sales of coal. This was the situation in the summer of 1900, when Chang Yen-mao, the Chinese Director-General of the above company, turned to Mr. Gustav Detring, his confidential foreign adviser, and entrusted to him the task of registering the company under British law in order to save the mines from being seized by Russia as spoils of war.

The Kaiping Mines

The Chinese Engineering & Mining Company of Tientsin was established in 1878 by Tong King-sing, one of the most enlightened and enterprising Chinese businessmen of his period. It was he who discovered the commercial value of the Kaiping coal basin and obtained the concession for its working from the Throne and whose money and brains carried it through to a commercial success.

Chang Yen-mao, a typical official of the old Manchu régime and a henchman of Viceroy Li Hung-chang, engineered the concession through the official channels for Tong, became interested financially in the company and, on the demise of the latter, succeeded him as director-general. Under Tong's administration, a British engineer, Mr. Claude Kinder, was brought out to supervise the working of the properties and through his influence the first railway was built in North China to connect the mines with Tientsin and the seaboard. Chang Yen-mao went up the official ladder until he became Imperial Commissioner of Mines, at the same time holding his position as director-general of the Kaiping properties.

For twenty years, the enterprise prospered to a degree the outside world never dreamed of, for although only a modest dividend was distributed to the shareholders, a handsome revenue came into the Government coffers and the pockets of the officials and directors through methods which only a Chinese would



President-Elect Hoover

understand and appreciate. The output of the mines rose at times to over 4,000 tons per day, necessitating the purchase of a fleet of six steamships, with wharves and storage yards in other Chinese ports to facilitate distribution of the coal. This, in turn, called for the construction of an ice-free port on the Gulf of Chihli to ensure continuous service during the winter months when fuel was in greatest demand. Under a special concession from the Throne, the company, therefore, acquired the land at Chingwangtao and started the construction of a pier, breakwater, loading and storage facilities and a spur railway connecting the port with the mines and the main line of the Imperial Railways of North China (now the Peking-Mukden line).

The company was capitalized at Tael 1,500,000 (say \$1,125,000) but its average dividend for years had never exceeded \$100,000, a rough nine to ten per cent. Notwithstanding this favorable showing after the government and the officials had diverted the major part of the profits into their pockets, the company ran deeper and deeper into debt. By 1900, its liabilities approximated Tael 4,000,000 and the creditors were clamoring for foreclosure, but being a semi-governmental enterprise, it was difficult to bring suit in the ordinary way through the Chinese courts with any hope of success. The six steamers had been hypothecated to the German Bank (Deutsche Asiatische) and when the Boxer troubles broke, the German admiral promptly seized and placed them under the German flag. As a matter of fact, the financial condition of the company had fallen so low that when the Russians occupied the mines and the Germans seized the ships, its shares were worthless. In addition, Chang Yen-mao, suspected of being in communication with the Boxers, was arrested, thrown into prison and would probably have been executed had it not been for the timely intervention of his foreign friends.

Some years previous, a Mr. C. Moreing, of the firm of Bewick, Moreing and Company, mining engineers and financiers of London, visited Tientsin and was received in state by Chang Yen-mao. Chang was interested in obtaining new capital to develop the mines and discussed with Moreing various plans to convert the enterprise into a Sino-British Company. When the latter departed for England, he carried with him a tentative proposition along these lines; together with a contract for furnishing a loan of £200,000 to the Chinese company to be issued in installments as funds were required for development work. Because of the uncertain political conditions in China, these bonds carried a high rate of interest, and a large proportion found their way into Belgium and Germany, thus giving to these countries a favored lien on the properties. Several propositions to convert the company into a Sino-British concern were subsequently advanced, but they all fell through because the Chinese insisted upon retaining administrative control. European investors would not hazard their capital in a Chinese enterprise under such conditions.

The Belgians, working as agents of Russia, were deeply interested in securing control of these properties. They already operated the Peking-Hankow line and were scheming to take over the Canton-Hankow concession while co-operating with Russia in ousting the British from the Imperial Railways of North China. Possession of the mines fitted into the Russo-Franco-Belgo scheme of conquest, for aside altogether from their commercial value, the ice-free shipping port of Chingwangtao on the Gulf of Chihli, was of immense strategic importance, a possible naval base that would come in handy when Russia made her next forward move.

Germany also had her eyes on the property and, as usual in the old days, we find her working closer with the Chinese than any of the other powers. Chang Yen-mao's intimate foreign friend and adviser was Mr. Gustav Detring, a commissioner in the Imperial Chinese Maritime Customs Service. This was the man who Li Hung-chang sent to negotiate the treaty of peace with Japan after the Sino-Japanese war. Japan properly refused to accept him as a proper representative of China and Li was forced against his will personally to negotiate and sign his own humiliation. Detring was also the same man the German Government had tried to force upon China as successor to Sir Robert Hart, and whose intrigues to bring this about two years before, led Great Britain to extract a promise from China that as long as British trade predominated in the country, the Inspector General of Customs would be a British subject. Detring was also a shareholder in the Chinese Engineering & Mining Company. Through his influence, several loans were

placed with the Deutsche Asiatische Bank and German investors urged to buy up the Kaiping bonds issued by Moreing.

Hoover Enters the Picture

This was the state of affairs when the Russian forces seized the Imperial Railways of North China and the Kaiping Mines in the early part of July, 1900. Faced with complete loss of their properties, and fearing for their lives, the Chinese were willing to accept any arrangement which would save the situation. Chang Yen-mao called in his confidant, Detring, turning over to him his powers as Director General with full authority to transfer the property to British registry and protection. Some time previous, Chang had requested Mr. Moreing to send him an experienced engineer to act as adviser to the Imperial Bureau of Mines. Moreing sent him one of his best men who had just completed a difficult job in Australia. Here enters Mr. H. C. Hoover. He arrived in Tientsin in 1899 to take over this important Chinese Government position and for more than a year was busily engaged in investigating and reporting on the mineral deposits of North China. He established his home in Tientsin and the outbreak of the Boxer Rebellion found him there actively engaged with other foreigners in defending the settlement against the Boxer assaults.

As Moreing's syndicate was already deeply interested in the property, Detring got in touch with Hoover and discussed plans to organize a new British company to take over the title. Hoover, however, had no power to act for Bewick, Moreing & Company. When he accepted the Chinese Government position he severed connection with his old employees. He accordingly telegraphed to London for instructions and in reply was authorized to act as the representative of Bewick, Moreing & Company to sign and accept a preliminary agreement for the transfer of the mines, but his principals declined to bind themselves to anything until they had an opportunity to study the provisions of the contract. Time being the essential element in the transaction, whatever was done had to be done at once.

The plan discussed between Detring and Hoover was almost identical with that which had been the subject of previous negotiations. The mines were to be transferred to Bewick, Moreing & Company, who were to organize a British company capitalized at £1,000,000. The Chinese shareholders were to receive £375,000 for the property and £100,000 in new shares were to be issued in England to obtain working capital, the balance (£525,000) less expenses and promotion fees, was to go into the company treasury to be issued as development work required. Under this arrangement the Chinese would retain control and it was so stipulated in the agreement.

Based on these conditions, a deed of sale was drawn up transferring the ownership of the mines to Bewick, Moreing & Company, Hoover was therefore not a principal. He was merely the stakeholder, intermediary or agent appointed by Bewick, Moreing to accept a conditional contract in their name.

Other versions of the incident state that he received the deed in his own name with the idea of transferring the property to American protection and, being unsuccessful in interesting American capital, sold the properties to a British syndicate. This would make Hoover personally responsible for all that followed and bring upon him the charge of committing a breach of trust. As time was the essential element in the deal, Hoover would have been compelled immediately to register the title deeds in the American Consulate, thus impairing their protective value, complicating the new financing and requiring the British syndicate to purchase the property direct from him.

The fact is, that immediately on receiving his commission, Mr. Hoover started on his journey to London and on his arrival handed over the deed and other papers to his principal, Mr. Moreing, and faded from the picture. As noted above, Detring took upon himself the sole responsibility for the initial deal in behalf of the Chinese Company and Mr. Moreing admitted at the trial in London in 1905 that he was personally responsible for what happened after the deed was delivered to him. These two statements completely absolve Mr. Hoover from any connection with the transaction other than that of a temporary stakeholder or agent.

Many of the popular "success" stories of Hoover's career state that he made his first million in China and the inference is that this must have come from his share in the profits of the Kaiping deal. As a matter of fact, when Hoover completed his mission and handed the deed of sale to Moreing, he returned to California to start life anew. Within two months he was employed by the new British Chinese Engineering & Mining Company as Chief Engineer. He held that position from January to September 1901, nine months. On his return to London, after nearly three years in China, his entire capital was in the neighborhood of \$30,000, all of it representing savings from his previous salaries. At that time Hoover was 25 years of age. He knew little or nothing about the intricacies of international political finance. His active experience had been confined exclusively to mining work. He had never been in London except to pass through it hurriedly when he went out to China. He had no connections in Europe and was practically unknown in London except to the firm of mining engineers who recommended him to the Chinese Government for the post of Mining Adviser. Hoover's reports on the Kaiping properties undoubtedly carried great weight in determining their financing with new capital, but the statement that he was responsible for and directed these intricate international negotiations is incredible on its face.

After concluding his mission in London, Hoover returned to his home in California. He had hardly arrived there when he received a telegram from the newly organized company in London offering him the position of Chief Engineer of the mines and instructing him to proceed at once to China. So we find him again voyaging across the Pacific, arriving at his destination in January, 1901, just six months after his departure. We leave him here for awhile and return to London.

Now what happened in London is not altogether clear in some points. The record is straight enough on certain public information but deficient in regard to what went on behind the scenes. In the first place, Mr. Moreing immediately communicated with Lord Salisbury and the Foreign Office explaining the conditions under which the deed to the property had come to him and requesting official support. The situation was a peculiar one. Although the Chinese Engineering & Mining Company was nominally a private Chinese corporation, its connection with the Chinese government was such that its real status was that of a semi-official enterprise under the control of the Peiyang Viceroy. This was clearly revealed in the subsequent Memorandum of Transfer, which is reproduced in full further on.

To this statement must be added the Dispatch from the Throne of January 1904, commanding Chang Yen-mao to regain possession of the property, in which the Empress Dowager declared that the mines were state property and could not be alienated without Imperial authority. These facts disclose that the Chinese officials were seeking to transfer a Chinese Government property to foreign protection at a time when a state of war existed and when one of the hostile Powers had seized the mines and instructed its troops to retain possession at all hazards. On the face of things, the Chinese were engaged in a highly dangerous game.

On the other hand, the British Government was pledged to give a monopoly of its support to the British & Chinese Corporation to finance official concessions in China. This corporation had advanced the loan to the Imperial Railways of North China and also held the concession to work the Nanpiao Coal fields adjoining the Kaiping basin; in reality, part of the same field. At the very time the deed to the Kaiping mines was handed over to Bewick, Moreing & Company, the staff of the British and Chinese Corporation had been forced to flee from the Nanpiao properties. So we find that the official British Group was already firmly installed in North China and had the option on any financing in that district calling for governmental support. Britain, facing a crisis with Russia, had allied herself with Germany to take mutual measures to oppose Russia's aggressions in North China and could not even protect its official concessions in the district at that time, so when Moreing submitted a new proposition which intensified the existing crisis, the British Foreign Office side-stepped and declined to support the deal if called upon for official recognition and protection. The Foreign Office had no objection to the deal going through as a purely private venture, but positively refused officially to recognize it until the situation cleared.

From the business standpoint, the proposition was equally difficult. The precarious financial situation of the company; the occupation of the mines and port by the Russian troops and the almost certainty they would be confiscated or held as guarantees for the Russian indemnity, and the seizure of its steamships by the Germans, all operated against the public organization of a new company. As a business proposition it was worse than a gamble. To sell shares in such a risky enterprise to the hard-headed British investor was an impossibility. They could not even be advertised or put on the open market under such conditions. To do so would have precipitated immediate complications with Russia, something that the British Government was trying to avoid until after the settlement of the Boxer troubles. Whatever was done to carry out the ideas of the Chinese, had to be conducted in secret.

Faced with these difficulties in transferring the property to British registry, Moreing was compelled to achieve his purpose in a roundabout manner. He took the proposition to Belgium and sold the deed to a group known as the Compagnie Internationale de l'Orient, already deeply interested in other important Chinese ventures. This syndicate was created by King Leopold and his intimate friends for the exclusive purpose of obtaining concessions in China to carry forward the political schemes of France and Russia. In order better to understand the subsequent misunderstandings which led to the lawsuit for recovery of administrative control of the property, it is necessary that the real character of this syndicate be outlined.

The Belgian Holding Company

When the Belgians obtained the concession for the Peking-Hankow Railway, the stipulation that the Russo-Chinese Bank should be the fiscal agent for the loan clearly revealed its political character, while the French Yellow Book for 1900, just as clearly reveals who financed it. This official document states that the Belgian company holding the concession, is a "Franco-Belgian syndicate in which the French element is represented by the big financial establishments of Paris and the big metallurgical industries of France," and, that the French financial share was three-fifths and the Belgian, two-fifths. The same book reveals, however, that when the loan was issued, the French banks subscribed to 84 per cent. and the Belgians 16 per cent. of the bond issue. In other words, the smaller Belgian companies organized to take over any particular concession, were merely the screen which concealed the big international financiers co-operating with Russia. All these smaller Belgian companies were subsidiaries of a holding Company, known as the Compagnie Internationale de l'Orient, (Syndicat de l'Orient), organized in Brussels on March 28, 1900, under the direct patronage of King Leopold and his business associates. The dominant interest in this new international combination was held by the following French banks, and industrial companies; Banque de Paris, Comptoir National d'Escompte, Banque Ottoman, Banque Parisienne, Societe Generale, Hottinguer et Cie (a banking house closely allied with Russia). A. J. Stern & Company, Mallet Freres et Cie, Demarchy-Selliere, E. Gouin, head of the Societe Construction des Batignolles (the foremost rolling stock builders and railway constructors in France), Dutillsul, Banberger, de Germiny, E. Noetslin, etc. The German participants were the group of banks and firms represented by the Disconto Gesellschaft and the Deutsche Bank. Austria-Hungary was represented by the Wiener Bankverein and the Banque Commerciale Hongroise; Russia by Rothstein, of the Russo-Asiatic Bank, Keck, and the Banque Internationale de Commerce of St. Petersburg; Switzerland, by the Credit Suisse, Le Bankverein and l'Union Financiere; Holland by the Amsterdam Bank; Italy, by the Credit Italien, Banque Commerciale Italienne and Manzie et Cie, of Rome. The Belgian group was composed of the Societe Generale, the new Banque d'Outremer, Banque de Brussels and Banque Internationale, followed by a long list of 400 subscribers comprising banks, bankers, manufacturers and individual capitalists interested in the venture. The new company was presided over by A. Beernaert, with three vice-presidents, Houzeau de Lehay, Nyssens, and Thys; the last two to take over the functions of administrators of important subsidiaries. The permanent committee of the company, in addition to the above four names, included the following; M. M. Furhnaam, Hovine, Walford and Lavelaye.

It appears that this Belgian international group also operated in England through an unregistered private organization known in financial circles as the British Oriental Syndicate, in which Mr. Moreing was an outstanding figure. The sale of the Kaiping properties to the Belgian holding company therefore brought all the conflicting bond-holding interests into a common pool and made possible the new deal that was then put through. This incident only goes to prove that no matter how Europeans fought over concessions and contracts in China and other parts of the world, when it came to the financing, there was complete understanding amongst the international bankers who put up the money and shared the profits.

A new company was hurriedly organized in London to comply with the stipulation of the contract. According to Rockhill's Treaties and *The Financial News* of London, the articles of association drawn up by the original incorporators, gives the names of six British dummies (three clerks, two secretaries and one gentleman) subscribing to one share each, whose names never again appeared in the transaction or in the directorate of the company. Furthermore, the articles of association (see Rockhill's Treaties) were what might be termed a blanket charter, enabling the company to engage in anything from selling peanuts to running the Chinese Government. There was no mention or even the suspicion of an intention on the part of the new company to engage in the specific deal for which it was created, viz, to take over as a going concern, the properties of the Chinese Engineering & Mining Company, other than in the name of the company. In fact, *The Financial News* of London, (January 8, 1900) referring to its registration said that "its object was to adopt an agreement (the parties to which are not named) and to carry on in China and elsewhere, the business of mine-owners etc.," and disclosing that the seven dummy incorporators were to appoint the first directors. Under the circumstances, the truth could not be permitted to come out. The agreement which the new British company was to adopt was not with the Chinese company but with the Belgian syndicate to whom the deed of sale had been sold.

The original draft of the articles of association contained a clause that control of the property in China should be vested in a China Board but as this conflicted with British company law it was apparently deleted from the final official document. When Hoover received his telegraphic instructions to proceed to China as Chief Engineer of the new company, he believed that this provision had been adopted. On his arrival at Tientsin, he reported to Chang Yen-mao that the agreement had been carried through and the new company formed. Shortly afterwards, Chang was informed by telegraph that the first installment of £100,000 had been paid in to the credit of the new company by the Banque de Outremer at Brussels. Hoover had been joined on his voyage to China by a Chevalier de Wouters, sent out as representative of the Belgian interests with instructions to assume the duties of general manager.

The main conditions of the deal being apparently complied with, the transfer of the old company to the new was duly signed on February 19, 1901, and with it a Memorandum setting forth the reasons and conditions of transfer. This document was signed jointly by Hoover and de Wouters on behalf of the new company and by Chang Yen-mao and Detring for the old. As all the subsequent misunderstandings and the law suit arose over the failure to live up to the provisions of this transfer, it is given here in full:

Memorandum

Relating to the Reorganization of the Chinese Engineering & Mining Company.

In consequence of the disturbances of last summer and the state of hostilities thereby created, serious danger arose for the status of the Chinese Engineering & Mining Company. One of the dangers being the confiscation of the property on account of the company's semi-official character in connection with the Chinese Government and another in the eventual cession by compulsion of the company's property.

In consideration of these eventualities it was thought in the interest of the Imperial Government and the Company's shareholders to convert the undertaking into an Anglo-Chinese company registered under English laws and protection. Another motive was that in order to overcome the financial difficulties caused by the hostilities, additional capital had to be raised by gaining foreign shareholders for the undertaking, a large sum of English money having already been advanced on the security of the Company's property.

His Excellency Chang Yi, Director-General of the Company accordingly appointed Mr. Gustav Detring to make the necessary arrangements which Mr. Detring did by signing on behalf of the Chinese Engineering & Mining Company with Mr. H. C. Hoover, acting on behalf of Mr. C. A. Moreing of London, a deed of sale placing Mr. Moreing in position to take the necessary steps with regard to the raising of capital in Europe and registering the company under British laws. It being understood that after conversion the Company should keep its name and be managed according to the articles of association covering as well the interest of the Chinese as of the foreign shareholders making all alike participants in profits and losses and that a working capital of £100,000 should be raised before the end of February. These main provisions of agreement having been acted upon by Mr. Hoover and notified to the Director-General Chang Yi, it has to-day been settled and decided that the Company shall in the future be constituted and managed as follows:

- 1.—The share capital of the Company to be £1,000,000.
- 2.—The Chinese shareholders to receive 25 shares of £1 each for each original share of Taels 100 each.
- 3.—The bona-fide liabilities of the Chinese Engineering & Mining Company up to the 19th day of February, including bonuses due to employees or shareholders from dividends or reserve funds shall be taken over by the new company and all what is due according to the final agreement entered into will be duly considered and honored.
- 4.—It is especially agreed to honor and duly repay the loans obtained from the Imperial Government, Taels 200,000 to be paid out of the first funds and the balance as quickly as possible.
- 5.—The shareholders whether Chinese or foreign shall have equal votes at all meetings of the shareholders when the company's affairs are discussed and questions decided.
- 6.—The management of the Company shall be conducted by two boards of Directors, one in China and one in London.
- 7.—His Excellency Chang Yi will be Director General resident in China as before, in general charge of affairs, and as such will have equal powers with foreign directors in China.
- 8.—The management of the property in China will be in the China Board.
- 9.—The London Board will be elected by all the shareholders, Chinese and foreign.
- 10.—It is understood that the word limited means the shareholders are in no case responsible for more than the nominal amount of their shares.
- 11.—It is also understood that all the legal taxes and duties payable to the Chinese Government will be paid by the Company as heretofore.
- 12.—It is also understood that the Director General will be the channel of all communications between the Imperial Authorities and the Company.
- 13.—It is understood that the Company will be managed in such a spirit as to make Chinese and foreign interests harmonize on a firm basis of equality to open an era of co-operation and protection that will enrich the Government and the people.
- 14.—All the unsettled accounts of the Company and questions relating to land tenure will be adjusted amicably by mutual consultation.

Dated this 19th of February, 1901.

Signed, sealed and delivered by Herbert C. Hoover and Chevalier de Wouters in the Presence of Alfred S. P. White-Cooper and C. D. Tenney

H. C. HOOVER
Chevalier
DE WOUTERS.

do. do. do.
do. do. do.

CHANG YEN MAO
G. DETRING.

As far as Hoover was concerned, these conditions were in line with those under which he had delivered the deed to Bewick, Moreing & Company, for as yet, he nor anybody in China knew the details of the financing in Europe. Hoover's job as Chief Engineer was to supervise the working of the mines and make them pay. Hoover tackled the job as any other American or European executive would have done, without any thought of Chinese official practices. The payroll showed some 20,000 coolies employed in the mines and in the construction of the Chingwangtao harbor works. In checking up, Hoover discovered that many thousands of laborers were drawing pay without showing up on the job. So he started the American brass check system, giving every Chinese laborer and employee a number and requiring that each check be turned in to the timekeepers as they entered and left the works. In the first month, this system disclosed that the pay-roll had been padded with some 8,000 names. At a wage of ten cents gold a day or three dollars a month, this put nearly \$300,000 gold annually into the pockets of the officials. Other economies, abolition of squeeze in other forms and stopping the leaks considered legitimate in a Chinese enterprise, together with improved methods of working and reduction of costs, enabled Hoover to make the mine pay a handsome dividend on the new capitalization the first year.

Naturally, the Chinese opposed him from the start. Chang Yen-mao was especially bitter at the way the young American outraged all the ethics of official Chinese business methods. His first clash with Hoover arose over the title deeds to the property. It appears that Chang in his position as director general, had sold some of the company's property at Hongkong for Taels 75,000 and failed to turn the money in to the company's credit. In order to protect the interests entrusted to his care, Hoover demanded that the title deeds to all the company's properties in all the ports of China be turned over to some trustee and when objections were raised, he forcibly seized the documents and deposited them in escrow in a foreign bank. This resulted in a serious loss of face for Chang; the deepest humiliation that could befall a Chinese official. When, in addition, he saw his sources of revenues cut off under Hoover's brass check system, he began to realize that unless the control was again brought absolutely in his hands there would be no money for the Viceroy, nor for himself. He pleaded with Hoover to continue the old methods, defending his position on the grounds that he had only recently paid Taels 90,000 for the position of director general and was entitled by Chinese custom to get it back from the property. Hoover, however, had a \$5,000,000 corporation with a bonded indebtedness of \$2,500,000 that had to be turned into a profitable enterprise for the shareholders and he declined to permit any interference in the management of his end of the work. That Hoover's methods were justified is shown by the result of the first year's working. Whereas, the old company, capitalized at Taels 1,500,000 (\$1,125,000) had never declared more than a nine or ten per cent. dividend (roughly \$100,000) the new company showed a profit of \$525,000 the first year on the new capitalization and \$650,000 the second year. In other words, the old Chinese company had been milked by the officials to the tune of over \$500,000 gold a year, which explains why its revenues were relied upon by the Viceroy to pay the expenses of the Peiyang fleet, as subsequently admitted in a Dispatch from the Throne.

Back in London

Once again we leave Hoover on the job and return to London. The details of the financing of the new company are somewhat involved, but sufficient evidence has been disclosed to gather an intelligent idea of how the deal was put through. In the first place, the promoters were confronted with liquidating the old company's liabilities, a statement of which formed part of the original deed. Nearly £200,000 of 11 per cent. debentures secured on the property, were held in Europe. Other debts to the amount of another £200,000 drawing an average 8 per cent. interest had to be settled and, when the transfer of February 19, 1901, was signed, still further liabilities were uncovered. In addition to one debt of Taels 75,000, the Peiyang Viceroy put in a claim for over Taels 500,000 loaned to the old Company, while Chang Yen-mao, the director-general, put forward a claim for Taels 600,000 for services rendered. There seemed to be no end to the company's liabilities once there was a prospect of new capital to liquidate them. Not only did the new company have to settle these outstanding obligations but provide a large amount of cash working capital to complete the costly harbor works at Chingwangtao. Approximately £600,000 were therefore necessary to put the new enterprise on its feet, something that could not be done under the proposed Chinese reorganization plan.

Now, no sooner had the Belgian syndicate acquired possession of the title deeds from Moreing than it cabled its agents in China to buy up all the Chinese shares offered. It is not known just how many old shares were bought in this manner, but it is known that the Belgians were successful in purchasing in one block the holdings of one of the most important Chinese shareholders (reputed to be the holdings of Tong King-sin) paying for it only Taels 60 or 40 points under par. With other shares that came to them in this way, the Belgian Group practically controlled the company and were enabled to impose the financial conditions which placed it on its feet. Having obtained control, the new company issued six per cent. debentures in Europe to the amount of £500,000 to retire the old eleven and eight per cent. obligations, and gave as a bonus to the bondholders £250,000 in shares. The Chinese as per agreement, were allotted £375,000 in new shares in return for their old script, but as noted above, probably one-third or more of their participation had already been bought up by the Belgian Group. The

balance of the shares (£375,000) went to the promotion syndicate, but it is not known how these were distributed.

A Vital Document

The only light that was thrown on the inside working of the syndicate was published in the form of a letter from a Shareholder to the Editor of *The Pall Mall Gazette* and reprinted in the *Hongkong Telegraph* of March 24, 1903. This letter clearly explains the new company's position in answer to the attacks upon it and should go into the record. It reads:

"It is a matter of considerable surprise that in all the communications emanating from the Director of the old Chinese company and their friends, so little mention has been made of the most vital of the documents on which the transaction is based. I mean those prior to the final transfer of the 19th of February, 1901. An examination of these documents would, I think, show that the charges of breach-of-faith made by the ringleaders in this agitation have no foundation. Although the later documents have been published in the press, these to which I now refer have never been disclosed, and it is not unreasonable to suppose anything that would tend to show that the other side had an answer to the insinuations that have been so freely made.

"It is not far to seek, the causes of this agitation. Before the transfer, the old Chinese Company distributed annually in dividends about £25,000 and in the last few years of its existence ran deeper and deeper into debt. Under the new management, installed by the present Engineering Company, on an output reduced by the Boxer troubles to a figure considerably under the average, the profits of the first year were sufficient to pay £75,000 in dividends and £30,000 in interest on debentures. Evidently by the transfer a leakage had been stopped, and anyone who knows the ways of the Chinese officials will perceive that the action of those now engaged in agitation against the present company may not be unconnected with the loss of profits that must have been secretly disposed of under the old régime. Coupled with this is the awakening of those who were shareholders in the old concern, who now see its value under more enlightened control, feel regrets, in spite of their income being increased, that it should have passed into the hands of the foreigners.

"Again, it is desirable to remember the state of the property at the date of transfer. The mines were in the hands of Russian troops, who held strict orders to retain them. The ships were in the hands of German creditors and other property had been seized by the German troops under the shelter of martial law. In addition, there was a number of creditors for large amounts, who, had not the transfer taken place, would have seized the whole of the assets and reduced the value of the shares to nothing. As it was, shares could be had at a price equivalent to 3s. 6d. in the present company. These facts show the difficulty in floating the company on the London market at a time China was in turmoil and that it was not so easy a task as it had been represented to be.

"Your article omits other facts. In regard to the debenture issue of £500,000 at 6 per cent., it is not stated that there was an old issue of bonds for £200,000 secured on the property bearing interest at 11 per cent.; that there were other debts aggregating £200,000 bearing interest averaging 8 per cent.; that some of these debts were overdue; that these creditors had not only to be paid out but to be recompensed for surrendering a position which entitled them to foreclose and take possession of the property. No mention is made of the fact that the Chinese officials in 1900 were anxious to offer any inducement to get rid of those who were in occupation—military occupation—of the property, but vainly forget their promises when this had been accomplished. It is not pointed out that for the recovery of possession of the property, diplomatic pressure had to be brought to bear. It is not pointed out that the company had to have money to carry through its great works at Chingwangtao harbor nor that the property which in the hands of its former administrators was worth a precarious £375,000, in stronger hands has become worth £1,000,000.

"Inquirers would find that after all these difficulties had been cleared up, the Oriental Syndicate had remaining to it 150,000 shares to be distributed amongst its many shareholders, and not 625,000 as intimated; that the debenture holders received a premium which they were in most cases in a position to demand, which even then, since the shares have found their levels after the boom in Shanghai, yield them a profit of not more than 25 per cent.; surely not too much in a mining venture in such a place as China.

"They will also find that the directors of the old Chinese company furnished a written statement showing that the real assets of the company after deducting liabilities, were less than £300,000, that they were glad at the time to be relieved of their desperate position and receive four-tenths of the new share capital and that it was they who insisted that the capital of the present company should be £1,000,000."

All the evidence in the case shows that the Belgians were in supreme financial control and with the arrogance which characterized their activities in those days, determined to run the company as a Belgian enterprise, managed, directed and staffed with Belgian appointees. All the troubles of the company for the first two years arose from this assumption of authority by the Belgians over an enterprise nominally under the British flag.

There is every evidence to support the categorical statement that it was this Belgian financial connection which imposed a strict

secrecy about the deal. The speech of Mr. Detring before the shareholders meeting is evidence that every effort was made to extract from the promoters the truth about the company's financial status and, that to every request for information they were put off. Only under the threat of a law suit nearly two years after the property had been transferred, was a statement extracted from the board in London and then only a bare outline, concealing the pertinent facts of the deal, was forthcoming.

The first notice concerning the existence of the new company was published by the *Tientsin and Peking Times* in March, 1901, reprinted from a Shanghai newspaper, which stated:

"The Kaiping Coal Mines and the railway connecting them with the main line of the Imperial Railways of North China and with the port of Chingwangtao, have been bought by an Anglo-Belgian syndicate called the Orient Company, in which King Leopold of Belgium has a large interest. The syndicate also buys the rights of the Lu-Han (Peking-Hankow Railway) together with its lines now in operation. The Chinese Engineering & Mining shares of Taels 100 are already being sought after at £25."

In this round-about manner were the China shareholders given the first inkling of the sale of the properties to the Belgian syndicate. At the second general meeting of the new company held in London, October 15, 1903, British shareholders protested against the maintenance of an office of the company in Belgium and, when the direct question was asked the chairman as to who held the debentures, whether it was the Banque d'Outremer or the Syndicat de l'Orient, he explained that the constitution of the board of directors was one-half British and one-half Belgian and that not only was one-half the share capital held on the continent but one-half the debentures also. He refused to answer the direct question as to what extent the Syndicat de l'Orient and the Banque d'Outremer were holders of debentures. This flat refusal to clear the atmosphere as to the Belgian holdings only served to strengthen the prevailing opinion that although the British were nominally in control, the Belgians held the whip hand.

Belgian Domination

From the time the Chinese Engineering & Mining Company was registered in London in December, 1900, until its amalgamation in 1912 with the Lanchow Mining Company, it was presided over by a Belgian chairman of the board and a Belgian managing director. The chairman was Colonel Albert Thys, a brilliant engineer officer of the Belgian army, who as lieutenant built the Congo Railway and was afterwards appointed president of the Congo Railway Company, one of King Leopold's key enterprises in Africa. The selection of this man from the board of the Compagnie Internationale de Orient to head the British mining company, emphasizes the political aspect of the deal and the necessity of having a Belgian official in supreme control whose loyalty to his King and patron would ensure secrecy and implicit compliance with orders from above. It is probably the only case on record where a foreign military officer of high rank acted as the chairman of the board of a British company operating an enterprise in a foreign country having such an important bearing on Empire strategy. The fact that Colonel Thys held this position for over 12 years, tells us in no uncertain manner where the financial control lay and it also tells us that the conditions which give to the Belgians this control, were beyond the power of the British Government to change. Otherwise, the Foreign Office would long before have had him ousted.

How the Belgians attempted to take over control of the property and delayed making a satisfactory statement to the Chinese shareholders is best told by Mr. Detring, in his address at the meeting of protest held in Tientsin, November 28, 1902. It follows:

According to verbal understanding, Mr. Hoover after the transfer should have retired and left the management in Mr. de Wouters' hands. But he stayed notwithstanding this undertaking at Mr. de Wouters' request, undertaking the functions of acting manager with Mr. de Wouters as his assistant. I immediately began to notice a disposition on the part of these gentlemen to act on their own initiative and to disregard the terms of transfer. I remonstrated and further I asked for a financial statement showing exactly how matters stood in London. This was promised repeatedly but did not appear. Then about June or July 1901, an inspector appointed apparently from Brussels appeared, by name Mr. Franqui, with whom I took up the matter of finance. He promised to obtain for me an official statement from Europe. In August and September came a large consignment of men, two of them were accountants from England, the remainder were engineers and nine employees from Belgium. These men were all sent out without any

requisition from this end. There have been since that time far more men than vacancies as a result of the influx, with consequent expense to the company. Early in September came Mr. Dugan, engaged from America to be general manager of the company. Although up to that time the management was nominally conducted under the supervision of a China Board consisting of myself, Mr. Yen-fu and Mr. Liang (the general manager being Mr. de Wouters appointed by Mr. Hoover) it happened that a crowd of employees came from Europe to join the staff without the slightest knowledge on our part that they were coming. Almost immediately on the arrival of Mr. Dugan, the general managers, Messrs. Hoover and de Wouters left for Europe.

I summoned a meeting of the heads of departments after Mr. Dugan had time to settle down and at the meeting I read over to Mr. Dugan the conditions of the deed of transfer and asked him if he was prepared to abide by them. He was unable to assent, for the reason that I have since learnt that Mr. Franqui, who exercised supreme powers for the board in Europe, instructed him to render any action of the board of managers abortive. Thus an impossible situation was created at once. I sent for Mr. Franqui, who was then in Shanghai. He came up in November last and I demanded from him fulfillment of the conditions of transfer as well as a full financial statement as to the capital account. I should mention that the news of a debenture issue of £500,000 at 6 per cent. had reached me casually two months before this. It is usual in the case of so enormous an issue of debentures to consult the shareholders, but there had been no consultation whatever with us on the subject, nor was any prospectus or invitation for subscriptions sent to us or to the shareholders at large in China. These debentures as you know carried a bonus of £250,000 in shares, standing at from 70 to 100 per cent. premium at the date of issue. So the reason of the issue was not apparent.

I got nothing satisfactory from Mr. Franqui, but he was able to tell me that Mr. Trouet, the managing-director from Brussels had left home for China and that he would be able to set all differences at rest. Mr. Trouet arrived and spent two months here. We had several interviews with a view of adjusting differences amicably, but nothing definite came out of the visit, except that Mr. Trouet promised that having personally learnt the exact points of difference between us, he would be able to lay them clearly before his colleagues at home and obtain a settlement satisfactory to all parties. The only immediate effect of Mr. Trouet's visit was that he destroyed the authority of the general manager over his staff and settled final plans for the Chingwangtao pier, which plans were upset as soon as he returned home. So that he left things worse than he found them.

Mr. Trouet left for Europe in February (1902) and we waited patiently for the result of his representations. As time went on and nothing came, it became increasingly evident that a deliberate system of delays had been adopted from the first and that no reliance was to be placed on the promises made. Accordingly, I wrote to the solicitors of the company in July last putting the facts of the case before them and warning them that we would wait no longer, but would take action to remedy our grievances. Soon after writing this letter, I received news that a new general manager had been appointed with full power to come to an equitable settlement with us and that he would arrive in August. We once more patiently awaited the arrival of a saviour. Mr. Wynne arrived, and as he had been given liberal powers a distinct forward was possible. I think I may say that Mr. Wynne recognized freely that the old policy of silence and delay was the wrong one and that there was much justice in what we were contending for. We at once proceeded to negotiate with a view to carrying out the conditions of the transfer with regard to management of the property by a board in China. As a result of these negotiations I understand that alteration of the articles of association is in contemplation with a view to meeting our demand.

As regards the important financial question I understand from Mr. Wynne that the position is as follows: Capital £1,000,000 out of which £375,000 is allotted to Chinese shareholders; £250,000 to debenture holders and £375,000 presumably allotted to promoters. (The meeting here gave audible expressions of astonishment). We have contended that this allotment to promoters is excessive and that it cannot be justified.....

Mr. Detring's Anger

Putting down his papers, and speaking with evident emotion, Mr. Detring concluded:

"One word more. For the action that has been taken in this matter I am chiefly responsible. I have been here a long time and been an advocate of the amalgamation of Chinese and foreign interests. I have suffered for this advocacy and undergone trials for it. The present is the greatest matter of its kind. In taking advantage of the troubles of 1900 I thought I had a handle with which to assure the amalgamation of foreign and Chinese interests. That attempt has been so far a grand failure. I appeal to you all to-day to try and make it a success. Perhaps you will be able to do so."

On the face of things, the financial reorganization of the company was no easy task and took considerable time. In fact, it was nearly a year before all these difficulties were surmounted. This explains why the Chinese were maintained in ignorance of the financial status of the company until some definite statement could be placed before them. The issue of the new debentures and stock bonus naturally occasioned considerable adverse criticism in China and even Hoover telegraphed to London that such a large issue was unnecessary as the revenues from the mines under improved working conditions were ample for all purposes. It is necessary

to stress this point, as it shows that Hoover had nothing whatever to do with the financial reorganization of the company. Hoover was on the job at Tangshan and Chingwangtao, as chief engineer, attending strictly to his duties and explains why he was unable to comply with the Chinese request for a statement regarding the financial status of the company.

Hoover Absolved

Detring's admissions in the above address absolve Hoover of any connection with the financial reorganization of the company. Hoover's disregard of the terms of transfer acknowledging the right of Chang Yen-mao to continue in supreme control as director-general, consisted in his flat refusal to permit Chang and his Board to continue a practice that was diverting the profits of the enterprise into Chinese official pockets; a very serious interference in Chinese eyes. We find from this statement that Hoover was in China when Mr. Franqui, the Belgian inspector with full powers from the board in London arrived on the scene followed by a consignment of Belgian employees who took over the key positions. Hoover's first clash with the Belgians came during this period when he opposed this violation of the transfer agreement. Hoover left China for good in September, 1901, having been on the job seven months, during which time he placed the enterprise on its feet and started it on the road to the prosperity it has since enjoyed under the new management. On his arrival in London, the board of directors, desiring to have his expert knowledge of the mines and conditions in China at their command, had the membership of the board increased to take him and de Wouters in as directors, a position he held until 1912, when the company was reorganized into the Kailan Mining Administration. His active participation in the affairs of the company from then on was limited to attending the occasional directors' meetings in London, when not absent in some other part of the world on his own business.

Real Value of Properties Disclosed

In the meantime, the political atmosphere had cleared. Peace with China had been signed and the indemnities fixed. The Russian troops, in the face of the strong coalition against them, had reluctantly released their hold on the railway and the mines and withdrawn to points outside the Great Wall, retaining possession of the railway line from Shanhaikwan northwards. The danger of the immediate confiscation of the mines as spoils of war had passed. The Chinese breathed more freely. Notwithstanding all the friction over the administrative control, the mines had prospered. Their real value under Western management had been revealed.

No More Official Graft

No sooner had the Chinese Government recovered from its fright and felt strong enough to resume its old practices, than it began to take stock of its revenues and perquisites. The huge indemnity imposed with the peace conditions, had cut a large hole in the Imperial revenues. The old juicy income from the Kaiping mines no longer came into the treasury. Instead, all the great profit over and above the dole that was handed out to the shareholders, was now being distributed abroad. The officials were peeved exceedingly. Although all were perfectly familiar with the circumstances under which the deal was made, as usual, they began to hedge. They had followed their old traditional diplomacy, playing one power against another and in the words of a British observer, had "got jolly well stung." Now, when the danger was over they wanted to go back on their bargain. The loophole to start a controversy was there. They accordingly called Chang Yen-mao to give an account of his stewardship of the properties. Chang was compelled to make public the details of the deal and confess that the power to handle the revenues as of old had been taken from him in violation of the provisions of the memorandum of transfer recognizing him as director general for life. He put up a good defence but was impeached by the censors for betraying his country and degraded in rank. In all probability, Chang would have suffered greater indignities had it not been for the hope held out by the memorandum. The Empress Dowager was "greatly distressed over this betrayal of China's sovereign rights" and in

a message from the Throne declared that the old company being semi-governmental in character, its properties could not be alienated without an Imperial Mandate. In other words, that it was considered, despite its nominal private character, as a government enterprise, whose profits were relied upon to defray the maintenance of the Peiyang fleet.

A new Viceroy had come into power in the Metropolitan province. Yuan Shih-kai, "the Strong Man," creator of the modern army, and bitter enemy of Japan, ruled over North China. Yuan called Chang Yen-mao to his Yamen and told him that he must get the contract annulled or lose his head. Yuen would be satisfied with nothing less than the cancellation of the registration of the company and the full restoration of China's sovereignty. He even declared his intention publicly in January, 1903, to take over control of the Kaiping Mines and confiscate all the properties for violation of contract. In fact, he memorialized the Throne asking for permission to carry out his threat and only awaited its command to act. Chang Yen-mao also went to Peking and laid his case before the Wai Wu Pu* and demanded diplomatic support in enforcing his claims.

For two years the controversy precipitated by the protests of the China shareholders was the subject of acrimonious comment in the newspapers of London and China, the Chinese press bitterly denouncing the financial arrangements and the transfer of control to European hands while the conservative British newspapers defended the transaction.

Aside from the one letter from the British Shareholder published in the *Pall Mall Gazette*, there were very few public statements explaining the new company's position. However, Mr. Moreing himself gave an interview on February 24, 1903, to the *Westminster Gazette*, in which he said:

"It is interesting to note also that for years the old company paid dividends at the rate of £20,000 a year, which was raised to £150,000 directly it came under European control. In view of this, the native shareholders have come to realize the real value of the property, and started the agitation to know why it was sold.

"Besides this, the Chinese officials, who had plundered the company for years of this difference between £150,000 and £20,000, brought pressure to bear; and Chang Yen-mao, Director-General of Mines for the Chinese Empire, who sold the property, was afraid to disclose the real nature of the transaction, shareholders and officials alike being kept in the dark as to the existence of the deed of sale. The shareholders were willfully deceived. Chang Yen-mao while posing as a badly used person was all the while in possession of the deed of sale, under the provisions of which he knew the whole action of the directors was unassailable.....

"It is unquestionable that until the arrival of the present general manager, the administration of the company was very defective.....

"In the past it was such a lucrative source of income to the Chinese officials that every effort is being made to recover the mines by making Chang Yen-mao repudiate his sale; if this succeeds the shares and debentures will be worthless. The support given to Chang emboldened him as Director-General of Mines to stop development of the coal field owned by the Company and put difficulties in the way of selling coal etc."

To the British Courts

Such a controversy could have only one ending. The Empress Dowager did not dare at the time to precipitate an issue with Great Britain by resorting to repudiation of the contract and forcible confiscation of the property. The war between Russia and Japan had started in the early part of 1904, and the international political situation in North China once more placed the Chinese in a dangerous position. It was no time to invite the hostility of the British Government, so the Chinese decided as a last resort to carry the case to the British courts. Now, in all the controversy over the case, it has never been fully emphasized that the issue was one purely of administration based on the Memorandum of Transfer of February 19, 1901. It had no reference to any money question or financial reorganization. The one point at issue was the right of Chang Yen-mao to manage the properties in China under a China Board of which he was to be the Director-General for life.

Properly to equip him for the mission, he was reinstated in his official rank and invested with the Imperial authority to prosecute the case in England. In November, 1904, His Excellency Chang Yen-mao, accompanied by his adviser, Mr. Gustav Detring, now Commissioner of Customs in Tientsin, Mr. Yen-fu, another Chinese

*Ministry of Foreign Affairs.

director of the company, and a suite of officials, departed for England on a German steamer, to be on hand for the trial set for January 17, 1905, in the High Court of Equity in London.

The Decision and its Appeal

With the testimony submitted at the trial we prefer to make no comments. The reports of the trial were published in the leading London newspapers of the day and copied by the newspapers in China.

The action was brought by Chang Yen-mao against the firm of Bewick, Moreing & Company, the Chinese Engineering & Mining Company and Others, to compel the carrying out of the Memorandum of Transfer of February 19, 1901. In the trial Mr. Hoover's rôle was that of the main witness upon whose activities as agent for his principal and upon whose testimony concerning these activities, depended largely the outcome of the suit. The decision recognizing the validity of the memorandum was largely influenced by Mr. Hoover's testimony.

The Chinese asked for justice and they got it, but in summing up, the British judge paid his compliments to the litigants in the following terse words:

"In the investigation taken before me of the transaction in question, it has not been shown to me that His Excellency Chang has been guilty of any breach of faith or of any impropriety at all, which is more than I can say for some of the parties concerned."

Justice Joyce held that the Memorandum of February 10, 1901, was binding upon the defendants and that effect must be given to it. The case was then appealed and went before the Supreme Court of Judicature presided over by the Master of the Rolls, Lord Justice Romer, and his colleague, Lord Justice Cozens-Hardy. The final judgment of this court was that there was nothing *ultra vires* in the agreement and in the main the judgment of Justice Joyce was right. The effect of the declaration made by Justice Joyce was, however, to give the plaintiffs rescission of the contract which could not be rescinded except upon terms which the plaintiff was not willing to accede to. Having taken away the right of rescission, the court gave the plaintiff an enquiry as to what damage he had suffered by the company breaking the agreement in the memorandum. The court also held that the declaration of Justice Joyce was properly made against Bewick, Moreing & Company, but stayed all further proceedings.

Why Chang's Claims Could not be Paid

In other words, Chang Yen-mao established before the British courts the validity of the memorandum giving him full control over the property as Director-General in China for life, but as this memorandum contravened the law which provides that all British companies must be directed by a board elected by the shareholders in England, it could not be enforced. In his ignorance of British law, Chang had made the mistake of signing a deed of sale in July 1900, without qualification and when, after the formation of the company, he stipulated the conditions of transfer, these could not be legally carried into effect. Chang was left with a claim for damages, and the High Court of Appeals stopped all further proceedings.

It is difficult after a lapse of twenty-five years to reconstruct a case from the newspaper reports of the trial, but in view of all that we now know of both sides of the controversy, the collective indictment of the British judge seems uncalled for. Coming at the conclusion of a highly involved legal decision which still gives the layman a headache to read, the last sentence is remembered when the rest of the decision is forgotten. There is no doubt that the British and Belgian promoters resorted to sharp practice in securing control of the Chinese properties, but they pitted their wits and their money against a group of Chinese equally crafty in business. The Chinese never complained officially about the financial end of the deal. All they wanted after the debts were cleared up and new funds were in the company's treasury, was the administrative control with the powers to put into practice their system of squeeze that would have once more diverted the revenues into their pockets.

A Classical Tragic Tale

The story of the Kaiping Mines is the story of all other Chinese industrial enterprises; the story of the railways, the story of the revenues; in fact, the story that has brought China where she is to-day. For beneath all the fighting and civil war that has ruined the country, is the determined struggle to loot its revenues and exact tribute from every industrial enterprise not under foreign protection. The Kaiping deal is the one transaction where the foreigner outwitted the Chinese at their own game and barring the Fushun Collieries under Japanese control, the enterprise stands to-day as the most profitable mining venture in China, a tribute to efficient foreign management and honest supervision over finances.

Let us return to the sequence of the story. Chang Yen-mao reported gleefully from London that he had won the case in the British courts, but neither the Wai Wu Pu or Viceroy Yuan labored under any illusions about the real meaning of the verdict. The correspondence between Yuan and the Chinese Foreign Office published in the China newspapers reveals that they fully understood that the decision, while favorable on its face, in no way altered the status of the company, which remained British and subject to British company regulations. When the Court of Appeals subsequently stopped all further proceedings, the Chinese Director-General had nothing but a claim for damages with no court to enforce payment.

It should be recorded here that the attempts of the Belgians to grab the administrative control and swamp the enterprise with Belgian employees had aroused the resentment of the British shareholders and the British Government was finally compelled to take notice of the situation. It was all very well for a Belgian army officer to be chairman of the board and for a Belgian managing director to administer the company's affairs from London, but British prestige would never have survived the shock of having this control extended to Belgian supervision of a British enterprise in China. Aside from this, the British Government found itself in a similar predicament as the Americans in the Canton-Hankow Railway concession which had been taken over by the Belgians in the same way they secured control of the Kaiping properties. But there was a difference. The Kaiping Mines and the port of Chingwangtao were strategic keys to the military control of North China. The war between Russia and Japan was being fought in Manchuria. Great Britain was the ally of Japan. China was the secret ally of Russia* and Belgium her silent partner. At any time the Russian forces might make a circling movement through Mongolia, violate the neutrality of North China and attack Japan on her exposed western flank. Belgian control of the Kaiping Mines and its shipping port carried with it a military menace of supreme importance to the Anglo-Japanese alliance. It is significant that in 1904, during the progress of the war that a new General Manager for the Chinese Engineering & Mining Company appeared in Tientsin.

Major Nathan Take Control

This man, Major W. S. Nathan, was one of the most brilliant engineers in the British army, brother of Sir Matthew Nathan, the newly appointed Governor of Hongkong. Major Nathan was one of those upstanding, two-fisted, super-efficient types, who knew his business. He soon let the Chinese and Belgians understand who was boss. From the time of his appearance in China, the Belgians were relegated to the technical supervision of the mines with no further voice in the administration of the property. The presence of this stern military disciplinarian in North China in supreme control of a key strategic position during the Russo-Japanese war was a guarantee to the British Government and its Japanese ally, that neither the Chinese, the Russians or the Belgians could slip over anything in that region. Under his able management, the property was developed into its present immensely prosperous condition.

The Manchu Government never conceded the legitimacy of the transfer of the Kaiping properties but dared not reopen the question after the decision of the British court of appeals. The British company declined to pay the Chinese Government's and Chang Yen-mao's claims for loss of sovereignty and deprivation of

*Under the Li-Lobanoff Agreement.

a life-time job. The Chinese then began to hatch plans of revenge. They placed obstructions in the way of sinking new shafts in the basin, interfered with the surveying parties, placed an extra tax on the sale of coal and raised the freight rates on the government railways. Defeated in obtaining control of the company, the Belgians and Germans also developed a good sized grouch and combined secretly with the Chinese to keep the British from profiting too much from their virtual domination of the mining possibilities of North China. Encouraged by the Belgians and Germans, the Chinese organized a new company to develop another part of the Kaiping coal deposits, to which, under its original charter, the Chinese Engineering & Mining Company held exclusive rights. This company, officially styled the Grand Mining Company of Peiyang and Lanchow (commonly known as the Lanchow Mining Company) was, in effect, a replica of the old Kaiping company, organized under Chinese laws, managed by a Director-General appointed by the Viceroy and subsidized with official funds. It was nominally a private corporation with the bulk of the non-Chinese shares held by the same Belgian and German groups interested in the Kaiping mines. Ignoring the exclusive rights of the Kaiping Company in the basin, the new Chinese company proceeded to sink shafts and work the same deposits. This brought forth a protest and for three or four years the old controversy was revived and threshed out in the press by the advocates of both sides.

Under Major Nathan's direction, the Kaiping properties continued to prosper in spite of all the difficulties placed in his way. From 1905 to 1911, the average annual profits were £174,811 while the output jumped from 876,000 to 1,170,000 tons. It was not long however before the Lanchow mines became a formidable competitor, and by 1911, this competition became so effective that the Chinese Engineering & Mining Company was compelled to fight to save its position. Backed with a large cash reserve and unlimited credit, the British company began to reduce the selling price of coal and brought it to such a low level that the new Chinese company was forced to the wall. Things might have worked out differently had the Government retained its ability to advance funds to its own enterprise, but the Manchu dynasty was nearing its end and the treasury was empty. When the Manchus went out and Yuan stepped in as President, he was willing to compromise. The coal war ended in an agreement approved by the Chinese and British governments amalgamating both companies under one administration while preserving their corporate independence.

The Chinese justified their refusal to recognize the exclusive rights of the Chinese Engineering & Mining Company in the Kaiping basin by reason of their failure to receive justice in the old deal after the decision of the British court had been in their favor and stipulated as a condition to the new agreement, that all the old Chinese claims against the Chinese Engineering & Mining Company be paid in full. This condition was accepted in the interest of harmony and the British company obligated itself to issue new debentures to the amount of £1,200,000, out of which Taels 1,500,000 were to be paid to the Lanchow Mining Company for payment of its debts; Taels 500,000 to be reimbursed to the Peiyang Viceroy and Taels 1,000,000 to be paid to Chang Yen-mao in settlement of all his claims. The last clause of the final Kailan Agreement signed June 1, 1912, reads:

"The claims of Chang Yen-mao, of Yang San-chin (for salary and police expenses), of certain employees of the old (Chinese) Kaiping Company (for bonus), and of the Chinese Government on account of sovereign rights and other claims have been settled and accordingly the said parties to the above agreement hereby agree and declare that such settlement shall be binding on them as from the date on which the said agreement shall have become effective."

Twelve years after the original deal and memorandum of transfer and seven years after the High Court of Justice in England had decided in his favor, the claims of Chang Yen-mao and the Chinese Government were paid in full. From the legal point of view, the old controversy terminated with the new deal. Whatever differences of opinion existed up to that time as to the legality or the morality of the original transaction disappeared in the new agreement creating the Kailan Mining Administration. The slate was wiped clean. In the reorganization of the company, Mr. Hoover who had retained his seat as director up to that time, severed his official connection with the board in London. So ends the story of the Kaiping mining deal.

Hoover's Own Report on China

Since writing the above article we have discovered in our files a copy of the Report on the Kaiping Coal Mines prepared, in 1902, by Herbert C. Hoover for the Institute of Mining and Metallurgy. The paper is largely technical, descriptive of the mines and coal seams, but there are certain paragraphs on the history, operation and management of the properties which reveal something of the tremendous handicaps Hoover had to contend against in eliminating "squeeze" and fighting superstition. In describing the founding of the company, he says:

"The company organized was of semi-official character and the Government was to participate in the profits and appoint the directorate. The capital was secured by a share issue, but the shareholders had no voice in the company, and were somewhat on the footing of debenture-holders with variable interest as the directors might decide. However, 12 per cent. was paid as a rule, and after this the officers considered that their services warranted the absorption of the remainder."

The first year under Hoover's management of the properties showed a profit of over \$500,000, the second year over \$600,000. Under the Chinese system, the most that had ever been distributed in dividends was \$100,000. The directors pocketed the \$500,000 and divided it with the Viceroy and Government officials in Peking.

In his comments on Labor and Cost of Mining, he says:

"Much has been written of the cheap labor of China, but those who have experienced its disadvantages have said but little. The simply appalling and universal dishonesty of the working classes, the racial slowness, and the low average of intelligence, gives them an efficiency far below the workmen of England and America. Neither is the Chinese working man in China to be judged by his countrymen in America, who, coming by natural selection from the best working class, are freed from a maze of custom and superstition, and imbued by the spirit of another country, which makes him unrecognizable in China. For crude labor, such as surface excavation, he has no equal, but as we proceed up the scale of skill, he falls further behind, until when we arrive at the skilled mechanic and factory operative, the productive costs with Chinese labor are as great per unit of production as in England and America. . . . When we consider the fact that in factory work he cannot begin to get the same work out of a machine, and correspondingly in mining he must have much ground open, the increased cost of superintendence and eternal vigilance against fraud, and general increase of administrative costs, we have many advantages of cheapness compensated. Under Chinese administration, where every deficiency of the workman is multiplied many times by the innate lack of administrative ability in his superiors and their more consummate dishonesty, we understand why the working costs on these mines have been three times what they would have been in England and America under similar conditions, and why with foreign administration, while the costs will perhaps fall below the foreign standard, it will be a result of very good management indeed. In two years these mines, with the management now installed, will prove the economic value of the cheapest labor in the world, and will be of no mean interest from the industrial standpoint.

In conclusion, he adds:

"Matters of collateral interest to those engaged in the enterprise are on a scale much above prosaic Occidental coal mining. The superstition of the miners finds many vents, and every accident is begot by some special devil and usually exorcised by fire-crackers. The lack of gas frequently re-occurs as a special blessing. The mulishness of the native miner in his refusal to accept instruction to under-cut the coal is a thing he has ever refused to embrace preferring to cut straight from the face; his capacity for thieving emphasized in a country where the division of the currency permits transactions in 1/20 of a cent, permits the abstraction of nails, screws, nuts, and even coal; his phenomenal capacity for bribery and "squeeze" require constant vigilance. The disregard for human life permits cheap mining by economy in timber, and the aggrieved relatives are amply compensated by the regular payment of \$30 per man lost. Cases have been proved of suicide for the amount, and other cases where six grief-stricken fathers claimed the reward for the same man."

Sun Fo's Stupendous Task

China's Railway Rehabilitation

How Sun Yat-sen Snatched Victory from Defeat and Turned His Dream Into ■ Practical Reality

By George Bronson Rea

IN our September number, appeared the plan for the rehabilitation, construction and improvement of the communications system of China, issued as an official document by Mr. Wong Peh-chun, Nationalist Minister of Communications. These plans were exhaustive, embracing the rehabilitation and extension of the existing railway system, (a herculean job in itself) the extension of telegraphs, long distance telephones, no less than 78 wireless stations, together with the establishment of Government radio manufacturing plants, shipbuilding, locomotive, car, and steel works, aviation fields, highways, waterways, steamship lines and other related developments. Although an estimate of cost was not included in the report, the total is obviously enormous, utterly beyond the power of China to defray for many decades to come.

Before we had time to digest and comment on Minister Wong's plans, the new Nationalist scheme of government went into effect. In this government, the portfolio of Railways is held by Mr. Sun Fo, the distinguished son of China's great Patriot and Teacher, the late Dr. Sun Yat-sen. Mr. Sun Fo recently returned from a protracted tour of Europe and the United States where he discussed informally with bankers and government officials the possibility of enlisting foreign aid in financing the reconstruction schemes of his government. The mantle of Dr. Sun has fallen upon his son. If he is to succeed, even in part, he must adhere religiously to the same rigid principles of honesty and common-sense that characterized his father's handling of the same problems. Conditions have changed since Dr. Sun Yat-sen startled the world with his plans for the international development of his country. At that time, Dr. Sun had the advantage of a national credit and foreign confidence in China's stability and integrity that would have enabled him to raise the initial sums required to carry out his plans. Sun Fo is handicapped at the very outset of his task by an utter collapse of China's credit abroad and a lack of confidence in her willingness and ability to liquidate outstanding obligations and provide guarantees and security for future investments of capital. It may be good domestic politics and excusable propaganda to stir the imagination of the Chinese people at this time with pen pictures of their country's future greatness, but when these schemes are itemized with corresponding estimates of cost, the total is so vast as to create a mental vertigo and reservation in the minds of foreign observers as to the rationality of those responsible for such publicity.

For, following almost immediately after the publication of Mr. Wong Peh-chun's rehabilitation plans, comes the announcement in the Chinese press of Mr. Sun Fo's reconstruction schemes, which alone total some twenty-five billion silver dollars. To finance this

vast program it is proposed to raise each year from abroad the sum of \$200,000,000, another \$200,000,000 from Government revenues (which at present do not exist) and a further \$100,000,000 from an internal reconstruction loan. Even at this rate, it would take fifty years of steady financing and uninterrupted stability to complete the projects, a dream that could be realized only if China is stabilized under a strong central government exerting control over the entire country and its revenues and enjoying an established credit abroad enabling her to compete in the financial markets of the world for the annual instalments of \$100,000,000 in gold loans required. For a government struggling to solidify its position, with a precarious control over the revenues of only five provinces, seriously to advance a reconstruction program calling for an annual investment of \$500,000,000 silver over a period of fifty years, is either an indication of its failure to grasp the rudiments of practical affairs, or a vain piece

of propaganda designed for home consumption. It is perhaps only fair to state that Mr. Sun Fo's scheme is based on his father's program as outlined in his "International Development of China," with a rough estimate of costs attached. It means nothing more than an announcement that, as far as possible, the general plan of Sun Yat-sen will be followed by future Chinese governments. It may be taken for granted that in working out his reconstruction plans, Minister Sun Fo will confine himself to the realities of the situation and concentrate his energies to practical railway projects that stand some chance of being carried out.

The cost of rehabilitating China's existing railway system must come from within. It is futile to expect foreigners to subscribe to further loans to rehabilitate lines their money has created and on which the interest has been defaulted. No sensible investor will hazard further capital to re-equip railways whose direction, operation and revenues have been taken over by military satraps in temporary control over the regions traversed by these lines.

As long as military commanders

continue to loot the Peking-Hankow line of \$500,000 a month, pocket the revenues of the Lung-Hai line and await the evacuation of Shantung by the Japanese in order to take over the Shantung Railway; as long as another militarist diverts the revenues of the northern section of the Peiping-Mukden and Chinese lines in Manchuria into his treasury and retains in his possession the major part of the rolling stock of other northern railways; as long as still another collects the receipts of the Peiping-Suiyuan and the Shansi Railways and another holds the southern section of the Peiping-Mukden line, while other minor satraps refuse to surrender to the Nationalist Government the revenues of the railways under their control, no foreign money will be forthcoming for rehabilitation purposes.



Sun Fo, Minister of Railways

There is a possibility that under given conditions, foreign assistance might be enlisted in the financing and construction of an entirely new scheme of railways properly safeguarded with essential guarantees for the supervision of expenditures and control of operation, but this possibility is predicated upon the restoration of foreign confidence in China's willingness and intention to pay her outstanding obligations. This confidence, can be established only by the immediate surrender of the existing railway lines and their revenues to the ministry responsible for their operation. A debtor, no matter how badly he may be hit, can always obtain further financial assistance if he inspires confidence in his ability, integrity and determination to help himself. The chances of raising capital abroad for any new railway construction program in China will be immeasurably improved if the Chinese through their own efforts evince a determination to rehabilitate existing lines, resume suspended payments of interest and settle outstanding indebtedness for materials supplied.

This can be accomplished only by restoring control over the existing railways to the Ministry responsible for their operation. When the traffic and commerce of the interior is once more circulating freely over the railways, the government's revenues will increase by leaps and bounds all along the line. It is folly to rely on an increase of customs revenues to defray the urgent expenses of government when the military leaders in control of the railways throttle the trade of the nation. If foreign governments are to recognize China's tariff autonomy and consent to the levying of increased duties while the military overlords continue to monopolize the railways and their revenues for military purposes, the concession of tariff autonomy will bring no permanent relief to the country.

Somebody must set an example in patriotism and self-denial. Some one of the military overlords must follow the precedent created by Sun Yat-sen in eliminating himself for the welfare of the nation. Here is a brilliant opportunity for Feng Yu-hsiang to distinguish himself and live up to the reputation he has been at great pains to build up through his frugality, contempt for pomp, and blunt honesty in governmental affairs. Feng is Minister of War in the new Nationalist Government and as much responsible for its success or failure as the more enthusiastic and immediate followers of Sun Yat-sen. He controls the major part of the railways throughout North China, outside of Manchuria. It is his duty to set an example that will strengthen the government of which he is such an important member, restore faith and confidence in China's integrity and make easier and possible the tremendous task of rehabilitation and reconstruction.

It sounds and looks well for the tuchuns to render lip service to the principles laid down by Dr. Sun Yat-sen for the salvation of China, but they ignore the outstanding truth that these principles rest firmly on a spirit of patriotic self-sacrifice, loyalty and honesty. Sun Yat-sen set the example for his countrymen to follow. Now that his son is called upon to carry forward the plans he renounced the presidency to carry out, it is well to review briefly, just what Dr. Sun did accomplish. The full story of Dr. Sun's railway activities has never been told. Some day, an authoritative review of these activities may be written. At this time, it is sufficient to emphasize and invite attention to the fact that he created a standard of official honesty and administrative integrity that must be adhered to by those who are now governing China under the provision of his will, if they are to restore China to her high place amongst the nations of the world.

Dr. Sun's dream was the development of China into a great and powerful nation, criss-crossed with a net-work of trunk railways carrying the products and commerce of his country to central ports on the coast under exclusive Chinese control and jurisdiction. He surrendered the presidency of the Republic of China to Yuan Shih-kai in order to devote himself to the realization of his dreams. Sun Yat-sen was not forced out. His renouncement of power stands in history as one of the greatest personal sacrifices ever chronicled of a patriotic leader who voluntarily effaced himself in order to stop further civil war and bloodshed and bring upon his country the blessings of peace.

Yuan, and his henchmen in Peking, with a fuller knowledge of China's secret treaties, knew that Sun's railway ideas could never be carried out; they knew that China was bound hand and foot by secret and other commitments which handed over a practical monopoly of railway construction to foreign powers and, when Yuan signed the document authorizing "Sun Wen" to organize a Chinese National Railway Corporation for the financing and construction of a national system of railways, he did so in the full hope and con-

fidence that Sun would be discredited, eliminated from politics and destroyed as a rival. Peking laughed at the joke perpetrated upon Sun.

Dr. Sun reposed such confidence in Yuan that it took some time and a careful study of the documentary evidence before he became convinced that Yuan had double-crossed him. When he finally realized what he was up against, he was big and honest enough to acknowledge his position. He met the situation by devising an entirely new and practical scheme of railway construction, embracing some 10,000 miles of essential trunk lines absolutely free from international politics or the possibility of foreign interference or protest. Yuan's plot to ridicule and ruin his rival, failed. When the Second Revolution was precipitated by Yuan's treachery, in July 1913, Dr. Sun had formally signed on July 4, an agreement for the construction of the Canton-Chengtou Railway (over 1,000 miles in length) and his Deputy in Europe had arranged with other financiers and contracting firms for the building of 4,000 more miles on the same terms. Dr. Sun's railway powers were annulled by Yuan on July 18, 1913, the very day that the detailed contract for the Canton-Chengtou Line arrived in London, where it was awaited to serve as the basis for signing further contracts, totalling 4,000 miles of new lines. Had the Second Revolution been delayed another two weeks, Dr. Sun's scheme would have gone through while his powers were legal and valid. His original railway scheme was a dream; in its modified form it was sound and financially practical. The contract between Dr. Sun Yat-sen and the British firm of Pauling and Company still stands in the history of railway financing as a testimonial to clean and honorable negotiation on both sides. Dr. Sun received from Pauling & Company, the lowest terms ever conceded by international finance for the construction of a railway in a foreign country. The contract created a new precedent in Chinese railway financing. It broke the power of the official financial groups designated to carry out the policies of their respective governments and paved the way for further benefits to China.

Dr. Sun Yat-sen's railway activities did not fail because of any inherent weakness in the scheme itself. It owed its failure, in the first place to the enthusiasm of his American Deputy, entrusted with the delicate task of carrying through the preliminary negotiations. When Dr. Sun's scheme was laid before Sir Charles Addis, head of the Hongkong & Shanghai Banking Corporation in London, leader of the Official British Group and Sir Charles became satisfied with the legality and validity of Sun's powers and those of his Deputy, he said that "*he would take over and finance every mile of railway that Dr. Sun would contract for.*" At this juncture, Dr. Sun's Deputy received a telegram from the late Willard Straight, appealing to his Americanism and urging him to bring the scheme to New York and give the American Group the privilege and prestige of signing the preliminary agreement. Dr. Sun's deputy, anxious to give his own country this distinction, departed hurriedly from London for New York, only to find on arrival that owing to the uncertainty over Wilson's foreign policies, the American Group would do nothing until he was inaugurated and his views on China definitely ascertained. Two weeks after Wilson assumed office, he withdrew official support to the American Group in the matter of the Reorganization Loan and declined to modify his policy in order to permit American capital to co-operate with the other Groups in the financing and construction of Chinese railways. Had Dr. Sun's deputy remained in London and concluded the preliminary contract with the British Group, the entire scheme would have been taken up and the funds raised to ensure its success. This original defeat was partially overcome by breaking the scheme into its component lines and contracting with individual British and French firms for their construction. With the signing of the Pauling contract and success once more in sight, came the outbreak of the Second Revolution and the annulment of Dr. Sun's powers.

This, in brief, is the history of Dr. Sun Yat-sen's railway scheme; a tribute to his far-sightedness and common sense in the handling and solution of practical affairs. That he failed was no fault of his own. Honest, sincere and patriotic, motivated solely by a high-minded desire to benefit his country, Dr. Sun created a precedent in Chinese railway financing, absolutely free from the slightest taint of graft, squeeze or corruption; a meritorious performance of official duty that should be inculcated in the minds of the Chinese people and their leaders as a standard that must be lived up to, if they are to win out in their fight to implant his other ideals in their political system.

(Continued on page 500).

Japan Recognizes Chinese Sovereignty Over Manchuria

THE recent campaign to influence the American Government to intervene in the Manchurian dispute between China and Japan has failed. The visit of Count Uchida to Washington, his frank talks with the Secretary of State and with the editors of leading New York newspapers, removed any apprehensions created by Chinese propaganda as to Japan's motives and activities in that region. His unqualified statement that Japan desires neither to annex Manchuria nor to establish a protectorate there; that Japan considers Manchuria an integral part of China and recognizes the sovereignty of China over the territory; that Japan will live up to the spirit and letter of the Open Door for all in Manchuria and faithfully carry out the provisions of the Nine Power Treaty, was sufficient to reassure the American people and government of her honorable intentions.

In fact, Count Uchida's clear cut and authoritative exposition of Japan's position in Manchuria was so convincing and so identical with our own problems in the Caribbean, that "The New York Times" was constrained to admit editorially that "*if the United States were placed in Japan's position, her Chinese policy would follow the same path as Japan's has done.*" The settlement of these outstanding Manchurian disputes is therefore a matter which concerns only the two nations involved and with Japan's recognition of China's fundamental sovereignty over the territory, there should be no insuperable difficulties in arriving at an amicable solution.

A little patience and forbearance on both sides, and pulling together for the development of the territory is all that is necessary to tide over the present tense situation. As China grows stronger and able to discharge her international obligations as a buffer between two other great Powers the larger issue will automatically solve itself. The interminable disputes arising out of mistaken and distorted ideas of Japan's intention and activities in Manchuria and the constant vicious propaganda tending to incite American hatred and distrust of Japan, can bring no lasting benefits to China. If American capital is to flow into China for constructive purposes a halt must be called to this pernicious campaign which creates in the minds of Americans the certainty that sooner or later China will go to war with Japan over Manchuria.

The Chinese are paying dearly for the campaign which held up the proposed Morgan Loan to the South Manchuria Railway. The same agencies are now at work to obstruct an American refunding loan to the Oriental Development Company, because in the past this semi-official Japanese enterprise extended its investments into Manchuria. An American loan to the South Manchuria Railway early this year would have liberated \$30,000,000 for extended railway and industrial improvements in a region where thousands of poverty-stricken, hungry, destitute and homeless Chinese are doomed to die unless food and shelter are provided this winter. The hunger and hardships, the death of these unfortunate home seekers, could have been averted by a timely American loan to the legally established South Manchuria Railway Company.

Sovereignty over Manchuria may be a precious asset to China, but only the Chinese forget that it was restored and secured to them by the blood and sacrifices of Japan; that Japan still stands on the firing line guarding the sovereignty of China over Manchuria until such a time as China herself is able to assume this responsibility. The Chinese forget that it was Japanese initiative and capital that converted this home of banditry and waste of desolation into the richest region of China; that the presence of Japanese troops in Manchuria has preserved the province from the civil war that has devastated the rest of China; that the peace and security guaranteed by the presence of these Japanese troops in South Manchuria induced millions of their starving and oppressed countrymen to seek a refuge under their protection. Taxed beyond human capacity to pay, their furniture, homes and small farms confiscated, their wives and daughters ravaged or sold into slavery, facing untold misery and certain death in their own home provinces, millions of sturdy Shantung, Chihli and Honan farmers sold their last remaining trinkets and possessions in order to obtain

the paltry few silver dollars to defray the expense of being transported like cattle to a new land of opportunity. Those who could not raise the money to cross the Gulf of Chihli by junk or steamer, started grimly on foot to cover the thousand or more miles to their destination. There they are now, trekking painfully their hopeless way northwards only to arrive at the end of the weary trail to find that their own grasping, heartless officials have forestalled them by distributing all the available productive land in Northern Manchuria among themselves. There are no more free homesteads awaiting the home-seeker in Northern Manchuria. These despairing millions if they are to exist at all, must sell themselves into a life of perpetual bondage and peonage to those who have despoiled them of their birthright.

The Chinese and their foreign propagandists are fond of disclaiming about the menace of Japanese militarism to China, but these same sycophants of some Chinese military satrap have not the courage or manhood to expose or condemn the misrule which has sent millions of peaceful Chinese to their death and their women to a fate far worse. In the name of Humanity, the American loan to the South Manchuria Railway should have been permitted to go through last winter. The cries of despairing thousands exposed to the hardships of a bitter northern winter and doomed to certain death or a life of perpetual slavery, will wring no word of sympathy or compassion from those foreign defenders of China's sovereign rights whose main asset and claim on their Chinese almoners is an uncompromising hostility to Japan.

We repeat that Chinese sovereignty over Manchuria may be a precious asset to China, but when Japan has given her solemn assurance that she recognizes and respects this sovereignty, it is time for common-sense and the laws of Humanity to prevail. The first duty of the Chinese Government is to secure the welfare, happiness and existence of its people. If the Nanking or Mukden Governments cannot provide or raise the funds to furnish employment, food and elementary comforts for the millions who have flocked into Manchuria, they should step aside and permit the South Manchuria Railway to undertake a task they are impotent to carry out themselves.

The paramount duty of Nanking and Mukden is to withdraw immediately all opposition to the legal activities of the South Manchuria Railway to raise a foreign loan for the development and improvement of productive enterprises. The bulk of the money so raised will find its way into the pockets of the Chinese laborer and into general circulation at a time when it is most needed. Such a loan at this opportune moment is equivalent to a famine relief fund for bettering the living conditions of millions of destitute Chinese deprived of their birthright and right to exist by the inordinate rapacity of their own official harpies.

It is folly for China to raise and press the Manchurian issue at this time. If it leads to a show-down, it can only result in further humiliation for China. The world has had enough of these humiliation incidents which are creating a spirit of hatred in China against all foreigners. We look forward to a renewal of friendly and harmonious relations between China and Japan, so that foreign capital can enter and assist in developing the resources of Manchuria. An American loan to the South Manchuria Railway simply means that the American banker and investor is seeking a legal, profitable and secure outlet for their capital. It carries no menace to China, no endorsement of any alleged Japanese program of expansion or aggression. It does, on the other hand, carry a solemn guarantee to China that as long as American money is invested in Manchuria in a Japanese controlled enterprise, that China's sovereignty will be jointly upheld by both Japan and America. To connect an American loan to a legally established Japanese company with territorial aggression and sinister designs upon Chinese territory and sovereignty, is an insult to the American bankers concerned and a reflection on the good faith of the American Government and people.

G. B. R.

Another Anti-Japanese Campaign Fails

The Successful Issue of the Oriental Development Loan on the American Market

SINCE the above article was written, the new loan for the Oriental Development Company was successfully issued in New York on October 30, by the National City Bank. The loan is for 30 years bearing $5\frac{1}{2}$ per cent. interest and issued to the public at 90. The proceeds of the loan are to be used for retiring two former issues aggregating Y.24,900,000 of which, Y.14,900,000 falls due on November 15, the balance maturing on May 15, 1930. It is understood that the dollar proceeds of the loan were purchased by the Japanese Government to replenish its gold reserves in the United States and that its equivalent was paid to the Oriental Development Company in Tokyo in Yen at an exchange rate of 47.

As usual, a violent campaign was started in Shanghai to protest against the issue on the grounds that American money would be used to aid and encourage Japan in her aggressive designs upon China. It is unnecessary to go into the details of how these protests originate or how the propaganda is manufactured for American consumption.

The hullabaloo raised early this year over the proposed Morgan loan to the South Manchuria Railway was sufficient to create a bad market for the bonds and postpone the issue. The loan in itself was perfectly legitimate and the American Government had no valid reason to interpose objection to its flotation. Its failure was due in the first place to the publicity given the negotiations in Japan at a time when Tanaka was loudly proclaiming a "strong policy" towards China. This coincidence provided an opportunity for dyed-in-the-wool anti-Japanese agitators in Shanghai to incite the Chinese and the publicity given to their protests in American newspapers made it unwise for the bankers to undertake the issue at that time. The flotation of a foreign loan for the South Manchuria Railway has simply been postponed. If American bankers fail to do the business, the loan will go to Europe where, although the interest rate may be a little higher, the bonds will be over-subscribed by investors anxious for their factories to participate in the distribution of orders for materials which have hitherto been placed largely in the United States. It may be that the American Government and bankers can be further influenced by these Chinese protests,

but the over-subscription to the Oriental Development issue does not seem to warrant such a conjecture.

The same methods which held up the South Manchuria Railway loan earlier in the year were employed to defeat the Oriental Development issue. In the same way that the former agitation was officially endorsed by Yang Yu-ting acting for the Peking Government, so Dr. C. T. Wang, Nationalist Minister for Foreign Affairs, entered an official protest against the Oriental Development loan. He is reported as having declared that the Nationalist Government would consider it an unfriendly act on the part of the United States and, that he had instructed the Chinese Minister at Washington to officially inform the State Department of these views. He justified his action by declaring that as the Oriental Development Company intended to employ some of the proceeds of the loan for investment in Manchuria, and as Manchuria was a part of China, his Government could not countenance a foreign loan to another foreign group for investment in Manchuria.

This statement indicates that the Nationalist Government has no intention of qualifying its stand on Manchuria, that it rests its case squarely upon the declaration of its delegates to the Washington Conference that it considers the 1915 treaties invalid and will, in the future, oppose any attempts of the South Manchuria Railway to obtain foreign capital for the improvement of its lines and expansion of its industrial enterprises. It constitutes a direct challenge to Japan's legal rights in Manchuria, which can only result in a hardening of the Japanese attitude and a postponement of the settlement of outstanding questions that seemed so promising only a few weeks ago.

It is difficult to understand the psychology which influences one government Minister to protest officially against a legitimate flotation on the American financial market and through his recognized publicity organs countenance a campaign of insult and slander against American bankers doing business with Japan, while his colleague in the same cabinet, confronted with the stupendous task of rehabilitating and reconstructing the ruin that is China, is basing his hopes for financial assistance upon these same American bankers.

G. B. R.

The "Model Province of New China"

Where Famine Stalks and the Babies are Killed

THE American people are fully informed on conditions throughout North China, where famine, misery and a lingering death are the inescapable lot of millions of unfortunate human beings. They have authoritative, first-hand information about the situation in North Manchuria where these half-starved refugees have migrated, seeking the right to live denied to them by their military overlords and tax gatherers of their own home provinces further south. It comes, however, as a distinct shock to learn that the same conditions now prevail in Kwangsi, the Model Province of New China, whose armies constitute the bulwark of the Nationalist cause.

Appeals to the China International Famine Relief Commission at Peiping from Kwangsi says there has been no rain since last spring and the autumn crops are an absolute failure. "*Famine sufferers are in evidence everywhere. Nine out of ten houses are deserted. Many live on bark and leaves of trees. Babies are killed and children sold for a mere song.*"

We have been told that Kwangsi is better governed and more prosperous than any other province in China. A thousand or more miles of highways built by the *corvée* system, is pointed to proudly as one result of efficient administration; a representative of the provincial government is now in Detroit with authority to purchase several hundred automobiles or busses; a provincial exhibition

is being promoted and the buildings erected. A new publicity organ in English has been started in Canton to advertise the province and attract attention to the great possibilities for the investment of foreign capital in developing its resources.

We now have the reverse of the picture. From Shantung, Chihli, Honan, Hunan, Hupeh, Shensi, Shansi and Suiyuan comes the same piteous story and appeals for succor. Famine in Hupeh is confined to the north part of the province, which was recently laid waste by the troops of General Fan Chung-hsiu. In Hunan thousands of people have been reduced to the verge of starvation by banditry, communist uprisings and drought. If help comes for these unfortunates, it must come from the outside, and every dollar contributed by foreign humanitarians for the relief of these suffering millions, is only an added incentive to the official grafters and harpies to loot and plunder their defenseless countrymen. Sovereignty imposes higher obligations upon a government than mere futile diplomatic protests against its fancied infringement. The first obligation of sovereignty is the welfare of the people entrusted to its care. While Nanking froths and fumes at the mouth against a picayune American loan to a legally established Japanese Corporation operating a railway in Chinese territory, hundreds of thousands of impoverished and destitute Chinese must rely on this same Japanese corporation for employment that will enable them to survive the winter.

Throttling Philippine Development

The Timberlake Resolution

HERE have been many obstacles to the successful development of the Philippines with American capital, some economic, some political and some international, but all of these could have been surmounted had it not been for the opposition of the Home beet sugar industry to any legislation that would open up the vast waste areas of the archipelago to cultivation. The land laws restricting the ownership or leasing of public lands in the Islands to 1,000 hectares, was passed by Congress in 1902 under the crack of the beet sugar whip. The same interests, working through the American Federation of Labor, were responsible for the extension of our Asiatic Exclusion Law to the Philippines, thus effectively closing the door to any possible large scale development in any line of agricultural activity. In protecting the Home beet industry against the competition of Philippine sugar, the nation has paid ten times over in the loss of a rubber supply grown under the flag.

race that is now taking place wherever the Mexican peon is gathered in large communities, is traceable largely to the importation of this labor by the beet sugar factories throughout the West.

The future of the Philippines depends upon the laying of a proper economic foundation upon which a firm and lasting political edifice can be erected. Only through industrialization can this be effected and, after all is said about the wonderful possibilities of the Islands it is sugar alone that can bring about this prosperity. It has been a long, up-hill pull for the industry, even with a duty free market for its product. It has taken considerable courage to invest capital in a country laboring under such tremendous handicaps as the Philippines, and only through some strong inducement, such as tariff concessions, has it been possible to do what has already been accomplished. Whatever prosperity the Islands now enjoy, is traceable directly to the free market enjoyed in the United States for their major agricultural crop.



Exterior View of the American Owned Calamba Sugar Central, Located in Laguna, Near Manila, the Total Daily Milling Capacity of All the Modern Central Factories in the Philippines is Only 39,125 Tons of Cane. The Daily Capacity of the Calamba Factory is 1,600 Tons

Only after a bitter fight waged through two Congresses by Roosevelt and Taft for free trade between the Islands the United States, was a compromise effected in 1909 which limited the duty-free importation of Philippine sugar into the United States to a maximum of 300,000 tons per annum. This limitation was subsequently removed under the Fordney McCumber Tariff of 1922. As the sugar crop of the Islands has now reached a total of 656,000 tons, both centrifugals and muscavados, the beet sugar interests once again are conjuring up a menace to the domestic industry. Their opposition has crystallized in the form of a Joint Resolution—known as the Timberlake Resolution—introduced in Congress at the last session, limiting the free importation of Philippine sugar into the United States to 500,000 tons annually.

The arguments advanced in support of the resolution are unconvincing. After all is said, there remains the admission of the Beet Sugar Lobbyists and Experts that they can never hope to obtain the capital necessary to build and equip sufficient factories to supply even the normal ratio of increase in the domestic consumption. Even if the land and capital were available, the low-priced labor supply required to operate the industry at a profit, would be impossible to obtain without opening our doors to the unrestricted entrance of undesirable immigrants. The mongrelization of the

Despite the many local obstacles to success, the industry has in the main prospered and plans are now being perfected for the erection of 16 new central factories. This will give added prosperity to the Islands, provide work for thousands of laborers and utilize areas now unproductive. These new centrals are not like the huge plants that dot the landscape of Cuba or the valleys of Hawaii; their capacity will average only 500 to 2,000 tons of cane per day, or 50 to 200 tons of sugar per unit. Seven of these plants are to be erected in Luzon: five in the Central Provinces; two in the Ilocos provinces; three on Panay; two on Negros and one on Mindanao. If these plans mature, it means another step forward towards the goal of ultimate economic success and general prosperity. The passage by Congress of the Timberlake Resolution would throttle this development.

In a pamphlet issued by the Philippine Sugar Association, the arguments in favor of the Timberlake Resolution are ably answered, but the following equally sound and convincing rejoinder prepared by Senator George H. Fairchild (secretary-treasurer of the association) for The Planter and Sugar Manufacturer is much shorter and more to the point. Senator Fairchild says:

Fears have recently been entertained by the domestic producers of sugar in the United States and foreign producers in Cuba that the

Philippines in a few years will be able to produce as much as 5,000,000 tons of sugar, thereby making the Philippine sugar industry a menace to the foreign Cuban interests and the United States beet sugar interests.

To finance such expansion there is not a fraction of the necessary capital available locally nor is there likely to be for many years to come. At present the total investment in the local sugar industry with an annual production of 550,000 tons of sugar aggregates a total of approximately \$175,000,000. To produce 5,000,000 tons would require an investment of \$1,600,000,000. Where would this capital come from ?

Since the extension of American sovereignty in 1898, the Federal as well as the Philippine governments have encouraged the development of the economic resources of the Islands, but in spite of such encouragement and the prevailing higher rate of interest paid for capital in the Philippines than in the United States, Cuba or Hawaii, capital in any large amount has not sought investment in the Philippines, with the result that very little progress has been made in developing the economic resources of the Islands. Moreover, should American capital decide to seek investment in the Philippines in great amounts, it is more likely that it will favor the production of rubber which is so vital to the economic life of the United States. While it has been demonstrated that the Philippines are capable of producing all the rubber the United States can consume, American capital has not come to the Philippines but has gone to Africa, Brazil and other countries in Latin America.

Two of the main causes of the timidity of American capital to seek investment in the Philippines are the unsettled political status there, and the attitude of American investors as to the geographical situation of the Philippines being "so far away from home." Another contributing factor is the prohibitive land laws in vogue in the islands. While some think or hope that the land laws may be so amended as to attract prospective investors of capital, others believe that the American abhorrence for long-time investments such as those made in the rubber industry, will not be sufficiently alluring to American capitalists who prefer quick returns on their investment.

It is true there are large unpeopled areas that could be developed for cane cultivation but it is equally true that there are many insurmountable difficulties to be encountered in opening up virgin and uninhabited regions, i.e., the great expense of clearing, the scarcity of laborers and the difficulty of bringing them and their families from the populated districts to unpeopled regions. The experience of the Mindoro Sugar Company which erected the first and only sugar Central in a heretofore undeveloped district on the island of Mindoro is a practical demonstration of these difficulties. More capital was introduced from the United States for investment in that venture than in any other American controlled Central. The experience of those pioneers was such that they still are known as the first and only group to have the courage to make the "great adventure."

Countries	Production		Per Cent Calculated Increase	Per Cent Actual Increase	Per Cent Apparent Increase
	Tons of 2,240 1898	(Long Lbs.) 1927			
Philippines	294,402*	656,720	17	—	123
Java	713,572	2,359,050	—	230	—
Hawaii	204,833	745,000	—	263	—
Formosa	68,260†	489,362	—	617	—

Countries	Production		Per Cent Calculated Increase	Per Cent Actual Increase	Per Cent Apparent Increase
	Tons of 2,240 1898	(Long Lbs.) 1927			
Porto Rico	53,999	596,000	—	1,003	—
Cuba	335,667	5,125,970†	—	1,427	—
U. S. Beet	32,471	974,185‡	—	2,900	—

*Average production from 1893 to 1897. †1904. ‡1925.

The scarcity of the labor supply has a deterrent effect upon the expansion of the sugar industry, as evidenced by the fact that practically all of the Centrals now in operation are located in districts where there is a dependable supply of seasonal laborers as a result of the development of the muscovado sugar industry over a period of many decades.

The uncertainty of climatic conditions in the Philippines is also a limiting factor. Due to the variations in the climatic conditions the yields of sugar per hectare in the Philippines may vary annually in some districts from 25 to 50 per cent.

There are always present the dangers of a scourge of cane pests and diseases as well as the animal diseases, entailing a high type of scientific management with its incidental expenses to control and combat these pests and diseases.

It is not generally known that the average annual production of Philippine muscovado sugar during the last five years of the Spanish administration was approximately 300,000 metric tons. The official record of muscovado sugar exportation for the period from 1893 to 1897 is as follows :

		Metric Tons
1893 .. ..	..	261,522
1894 .. ..	..	210,646
1895 .. ..	..	341,470
1896 .. ..	..	229,911
1897 .. ..	..	202,091
Average .. ..	..	249,128

The local consumption of muscovado sugar during the last five years of the Spanish régime was conservatively estimated at 50,000 metric tons or an average production of 299,128 metric tons or 294,402 long tons. In 1927-28 the production of Philippine centrifugals amounted to 567,263 metric tons and the muscovado production was estimated at 100,000 metric tons or a total production of 667,263 metric tons or 656,720 long tons. Compared with the increase in the production of other countries, the development of the Philippine sugar industry has been relatively slow as may be seen from the following tabulation :

Before the establishment of the modern centrals the average yield in the Philippines was officially reported at approximately 30 piculs per hectare or 0.85 short ton of sugar per acre. In 1927 after thirty-six centrals were erected which took the place of from 2,000 to 3,000 muscovado mills, the yields increased to 56.50 piculs per hectare, equivalent to 1.60 short tons per acre, or an increase of 90 per cent. as shown below :

		Production			Yields	
1927		Hectare	Piculs	Metric Tons	Piculs Per Hectare	Short Tons Per Acre
Centrifugals*	..	117,665	8,455,463	534,808	71.86	2.03
Muscovados†	..	66,642	2,017,970	127,636	30.28	0.86
Totals and averages		184,307	10,473,433	662,444	56.82	1.60

*From the official record of the Philippine Sugar Association.
†From the official record of the Bureau of Agriculture.

CENTRALS IN OPERATION, 1927-28 CROP		
NAME OF CENTRALS	LOCATION	DAILY CAPACITY METRIC TONS OF CANE
NEGROS		
Bacolod-Murcia	Bacolod, Negros Occ.	2500
Binalbagan	Binalbagan, Negros Occ.	1675
Bais	Bais, Negros Or.	1500
La Carlota	La Carlota, Negros Occ.	3000
Danao	Escalante, Negros Occ.	300
Bayarin	Kabankalan, Negros Occ.	600
Palma	Ilog, Negros Occ.	400
Lumangub	Bago, Negros Occ.	300
Talisay	Talisay, Negros Occ.	100
Hawaiian-Philippine	Silay, Negros Occ.	2000
Isabela	Isabela, Negros Occ.	1850
Sagay	Sagay, Negros Occ.	400
Masa	Bago, Negros Occ.	2250
Manapla	Manapla, Negros Occ.	1300
San Carlos	San Carlos, Negros Occ.	1600
San Isidro	Kabankalan, Negros Occ.	400
Talisay-Silay	Talisay, Negros Occ.	2400
Victorias	Victorias, Negros Occ.	1000
Total		23,575
LUZON		
Balanga	Balanga, Bataan	200
Calamba	Canlubang, Laguna	1500
Carmen	Calatagan, Batangas	500
Nasugbu	Nasugbu, Batangas	1200
Bamban	Bamban, Tarlac	750
Calumpit	Calumpit, Bulacan	300
Mabalacat	Mabalacat, Pampanga	200
Cabiao	Cabiao, Nva. Ecija	250
Pasudaco	San Fernando, Pampanga	3000
Del Carmen	Del Carmen, Pampanga	3600
Manaoag	Manaoag, Pangasinan	200
El Real	Calamba, Laguna	400
Phonix	Murcia, Tarlac	100
Total		12,300
PANAY		
Asturias	Dumalog, Capiz	800
Pilar	Pilar, Capiz	800
Total		1,600
MINDORO		
San Jose	San Jose, Mindoro	1,100
CEBU		
Cebu	Talisay, Cebu	500
LEYTE		
Ormoc	Ormoc, Leyte	150
Grand Total		35,125
CENTRALS UNDER CONSTRUCTION		
Tarlac	Luisita, Tarlac	3000
Arayat	Arayat, Pampanga	750
Sara-Ajuy	Ajuy, Iloilo	600
Santa Cruz	Santa Cruz, Ilocos Sur	150
Bogo-Madellin	Bogo, Cebu	500
Total		5,100
PROJECTED CENTRALS		
Balayon	Balayon, Batangas	
Cotabato	Cotabato, Mindanao	
Mariguina	Mariguina, Rizal	
La Union	San Fernando, La Union	
Barotac	Barotac, Iloilo	
Januay	Januay, Iloilo	
Toledo	Toledo, Cebu	

Central on Operation

Had the Filipino planters in the last five years of the Spanish régime enjoyed the advantages of modern central facilities, the improved methods of cultivation which have been introduced in recent years such as the application of fertilizers, the introduction of modern agricultural implements and the planting of heavier yielding cane varieties, their production would have averaged 568,343 metric tons instead of 299,128 metric tons. The difference of 98,920 metric tons between the actual production of 667,263 metric tons in 1927-28 and what the average production would have been during the last five years of the Spanish administration, represents a calculated increase of 17 per cent. in the production for a period of thirty-one years, which may be attributed to the increase in the area cultivated to cane. Basing our calculations on historical sources, the increase in cane areas since the American sovereignty is estimated at 30,000 hectares or 74,130 acres. An effort is now being made to verify this estimate.

In view of the foregoing statement and the judgment and experience of those who are best qualified to express an opinion, the production of Philippine sugar ten years hence is not likely to exceed a maximum production of 935,000 tons of sugar in any one year as shown by the following table :

(Metric Tons of 2,240 Lbs.)					Maximum Production Ten Years Hence
Island	..	..	..	Present Production	
Negros	..	..	..	391,733	500,000
Luzon	..	..	..	151,355	300,000
Panay	..	..	..	17,754	60,000
Cebu	..	..	..	388	25,000
Mindoro	..	..	..	6,033	25,000
Mindanao	..	..	..	None	25,000
Total	..	..	..	567,263	935,000

With an annual increase in consumption of 5.31 per cent, the United States ten years hence may consume a total of 9,500,000 long tons of sugar. Based on experience to date it can be presupposed that this enormous quantity will be drawn from the following sources in approximately the proportion indicated :

(Long Tons of 2,240 Lbs.)					
DOMESTIC SUGAR					
U. S. beet and cane sugar	..	..	..	1,000,000	
Hawaii	..	..	..	1,000,000	
Philippines	..	..	..	1,000,000	
Porto Rico	..	..	..	600,000	
					3,600,000
CUBA					
(Assuming no restriction on the Cuban crop)				6,000,000	
Less 20% exported to other countries and consumed at home	..	..	..	1,200,000	
					4,800,000
Total available supply	..	..	..		8,400,000
Deficit in the U. S. Requirements	..	..	..		1,100,000

Should Cuba continue its policy of restricting the Cuban crop to 4,000,000 tons, the deficit in the United States sugar supply ten years hence will be 2,700,000 tons. Where will this sugar come from ? The preference should be from sources under the American flag, where its production can be controlled when necessity demands.

Dependent as it is upon foreign labor and beet seed, will the continental United States beet and cane industry be likely to progress at a rate that will meet the apparent deficit of 2,700,000 long tons in the United States sugar supply ten years hence ? If not, the United States will have to continue to rely as in the past upon foreign countries for two-thirds of its annual requirements.

Lacking the political and economic efficiency of the governmental system, which in Java has facilitated the rapid and universal adoption of advantageous innovations within two to three years after their introduction, as has been recently evidenced in the extension of the plantings of the P.O.J. 2878 variety, increasing the present crop 30 per cent. beyond the expectation prior to the development of this remarkable variety, the Philippines will not double its production within a period of ten years, if the experience of recent years is a dependable guide.

Only recently Governor Stimson has received from a special agent, Mr. Lyman P. Hammond, a report of the past, present and

future prospects of the development of the resources of the Philippine Islands, showing that the development under American sovereignty has been relatively meagre and that there is little hope for any rapid advancement in the future. This is a confirmation from an independent and unprejudiced source of our contention that there is no justification for the fear that the development of the sugar industry in the Philippine Islands within the next few years will be unduly accelerated.

Since the foregoing speculations are reasonable, there would appear to be no justification for the fear on the part of the United States beet producers that their home markets will be adversely affected by an over-production of sugar in areas controlled by the United States.

The Enthronement of the Japanese Emperor

(Continued from page 481).

law, so that, on the one hand, Our Imperial posterity may possess an express guide for the course they are to follow, and that, on the other, Our subjects shall thereby be enabled to enjoy a wider range of action in giving Us their support, and that the observance of Our laws shall continue to the remotest ages of time.

We will thereby give greater firmness to the stability of Our country, and promote the welfare of all the people within the boundaries of our dominions ; and We now establish the Imperial House Law and the Constitution. These laws are really only an exposition of the grand precepts for the conduct of the government bequeathed by the Imperial Founder of Our House and by Our other Imperial ancestors. That We have been so fortunate in Our reign in keeping up with the tendency of the times as to accomplish this work We owe to the glorious spirits of the Imperial Founder of Our House and to Our other Imperial ancestors.

We now reverently make Our prayer to them and to Our Illustrious Father, and implore the help of their sacred spirits, and make to them solemn oath never at this time nor in the future to fail to be an example to Our subjects in the observance of the laws hereby established.

May the heavenly spirits witness this Our solemn oath !

In spite of the customs and traditions which had influenced the habits and the labors of the Japanese people for centuries, the entire nation responded to the call of progress, because to disobey this call would be to disobey the Emperor, which is inconceivable. Obedience, Patriotism, an unwillingness to remain in a secondary position among the nations encouraged the Japanese people to strain every effort to accomplish the whole course of the Industrial Revolution in Western countries in less than half a century. From a nation which employed the most primitive means of production and distribution, Japan is to-day electrified, has developed a self-sufficient steel industry, an independent shipbuilding industry, and is producing manufactured goods for export. There is no record in history of a nation accomplishing as much in so short a period.

The present Emperor, who is the 124th Emperor of Japan, enters upon a great heritage and he is enthroned at a moment when Japan is at peace with all the world and when there is not the slightest prospect of Japan ceasing to be at peace.

His Imperial Majesty, Hirohito, Emperor of Japan, was born on April 29, 1901. He was given the usual education at the Peer's School and in 1902, he was proclaimed Crown Prince. In 1916, he was appointed captain of the Army and lieutenant of the Navy, his promotion to higher military rank being gradual until 1925 when he became a colonel of the Army and a captain of the Navy.

During 1921, the Crown Prince visited Europe, being the first Japanese of his rank to engage upon such a voyage. He was most hospitably entertained in England, where he and the Prince of Wales formed a lasting friendship. The Prince of Wales returned this visit the following year as the guest of the Crown Prince.

The Crown Prince was appointed Prince Regent in November, 1921, on account of the illness of his father, the Emperor Taisho, upon whose death, on December 25, 1926, Hirohito became Emperor of Japan.

Hirohito married the Princess Nagako, daughter of Prince Kuni on January 26, 1924.

The Emperor has three brothers : Yashuhito, who is popularly known as Prince Chichibu, Nobuhito and Takahito, and four sisters, Masako, Fusako, Nobuko and Toshiko.

Two New High-Power Radio Stations for China

Reviving the Radio Dispute

A CONTRACT that promises to reopen the old triangular radio dispute between China, Japan and the United States was signed on November 3, between Mr. Roy De Lay of the Electric Service Corporation of Shanghai and Mr. Chang Ching-kiang, Chairman of the Nationalist Reconstruction Commission. The new contract is one covering the erection and equipment of two high powered radio transmission stations and three receiving stations in the Shanghai district at an estimated over-all cost of \$600,000. The stations are to be owned and operated by the Chinese Government and the contract involves no operating concession to the company furnishing the plant. Mr. De Lay's company, (organized under the China Trade Act) represents the Radio Corporation of America and it is understood that all the equipment contracted for is to be furnished by this concern.

From the technical standpoint the plants will be the equal of the finest in use in the world to-day, the transmitting plants having 20 kilowatt short wave transmitters and using the Marconi beam system. One sending station will communicate with a Radio Corporation station erected in California especially for this service while the other will be reserved for European business, "hooking up" with the Trans-Radio Corporation in Germany. The receiving stations will function along the same lines, one for receiving from America, one from Europe, and the other to be held in reserve. The terms of the contract provide that the American corporation will send one engineer to supervise the erection of the station by Chinese engineers and other clauses include a guarantee for a range varying from 2,500 to 9,000 miles for day and night service. As stated, the contract does not give any monopolistic rights to the American corporation, each party being free to make any traffic arrangement with any other country.

It is also reported that previous to signing the above agreement, the Nanking Government contracted with the Telefunken company of Germany for the erection and equipment of four one-Kilowatt automatic short-wave wireless stations to be located at Shanghai, Tientsin, Hankow and Canton.

It is becoming increasingly evident that the Chinese authorities, of whatever faction, are determined to ignore their previous wireless commitments and start on a new basis which gives them supreme control over their communications system. It is too early as yet to forecast the probable effect of this new policy, as it is understood that neither the United States or Japan are willing to forego the wireless rights previously ceded to them under the terms of well-defined contracts. The Chinese state that the Radio Corporation of America has signified its willingness to cancel its old contract, but there is reason to believe that the State Department is not inclined to endorse this procedure. The Japanese attitude indicates that Mitsui & Company is willing to turn over unconditionally its wireless plant near Peking to the Nationalist Government, providing Nanking will agree to cancel the contract with the Federal Wireless Company in connection with the erection of a station at Shanghai. A proposal along the above lines is reported to have been submitted by Mitsui to Nanking some time in October, and was taken under consideration by a special commission who has since reported to the Government on the status of all China's wireless commitments with foreign companies.

The conclusion of the recent contract with representatives of the Radio Corporation of America before a definite solution has been arrived at of the outstanding Mitsui and Federal Wireless claims, may have the result of reopening the old controversy. The erection of numerous small wireless stations throughout China, the last few years, and the reconstruction program providing for the erection of another 78 similar stations, indicates better than anything else, a hardening of the Chinese determination to proceed ahead completely

indifferent to outstanding contracts. As these smaller stations are only for domestic traffic, it leaves the major problem of overseas communication to the conflicting claims of Mitsui and the Radio Corporation of America. We would not be surprised to learn that a new protest has been entered against the recent American contract for the erection and equipment of the proposed new stations, by both the American and Japanese Governments.

Automatic Telephones for Nanking

FOLLOWING the announcement of the contract between the Nationalist Government and the representatives of the Radio Corporation of America for equipping two new high powered wireless plants, comes the news of the signing of an equally important contract entered into between the Nationalist Government and the Automatic Telephone Company of Chicago for the erection and equipment of an automatic telephone exchange for Nanking. The system will have an initial capacity for 9,000 subscribers in their offices to be known as Central Hsiakwan, in addition to repeaters for service to Pukow and Puchun, and will cost approximately G.\$800,000.00. Underground and aerial cables with submarine connection across the Yangtze River to Pukow and aerial lines to Puchun will be installed so that the service may be extended to the territory adjacent to the new Nationalist Capital.

The system will be on a 5-digit basis, the dials being equipped with "Arabic" numerals. The dial service will be extended to the subscribers of the manual systems now operating in Pukow and Pushun. These two areas will be converted to automatic at some future date.

Each automatic telephone office will be equipped with two sets of storage batteries, motor generator charging sets, oil engine driven dynamos, ringing machines and testing officer's desk. In addition the Central Office will contain an Information Bureau which can be reached from any automatic telephone in Nanking by simply dialing three figures or digits.

Standard American telephone engineering practice is to be adopted. The construction and maintenance will be of the highest order, and first class telephone service for China's new capital is assured.

The equipment of Nanking with 9,000 Strowger automatic telephones, wiring, cable connections, etc., will cost one and four-fifths millions of American gold dollars. The National Government makes the contract rather than the municipality of Nanking. About one-third the cost is said to have been already paid. The American company putting in the 'phones will own them until paid for but large payments must be made as the work proceeds. Nanking has 4,000 manual 'phones to be replaced and an additional 5,000 automatics are contracted for.

Mr. Harry S. Janes, representing the Automatic Electric Co. of Chicago, has already equipped Harbin and Dairen with the Strowger automatic 'phones.

More than 55,000 Strowger Automatic Telephones have been installed in Tokio in the last seven years. Thousands of American companies and municipalities use this system. The Automatic Telephone Manufacturing Co., has an immense plant in Liverpool, England, as well as parts factory in Chicago, Ill., U.S.A.

The Automatic Electric Co., Ltd., have a branch office located at 142 Szechuen Road, Shanghai, under the direction of Harry S. Janes with K. T. Long as Manager for China.

Japan's Quest for Iron

Where Will China Get Her Future Supply ?

IN the race for industrial power, Japan is handicapped by a scarcity of iron and to supply this deficiency has turned to every country in Asia and Australasia for her growing requirements. For many years, she sought to find this supply in China and has spent perhaps Y.100,000,000 in acquiring iron mines and blast furnaces in this country. The fact has been gradually forced upon Japan that China can never furnish her with sufficient iron, simply because she has too little for herself. According to Mr. K. L. Hsueh in a recent issue of the "Chinese Economic Journal," about 90 per cent. of the known iron resources of China have passed under Japanese control. Ten years ago, this feverish quest for iron on the part of Japan, alarmed even the United States who saw in Japan's activities, preparations for war in the Pacific. Chinese orators and writers still fulminate against Japan's loans to the Han-Yeh-Ping Company and periodically create an agitation to prevent her from collecting or taking over direction of the properties in order to make them pay. It is now quite possible that the Y.45,000,000 already advanced to this premier Chinese industrial concern by the Yokohama Specie Bank over a period of 18 years, will never be repaid, nor will China ever live up to the contract to furnish the tonnage of ore stipulated in the loan agreements. Japan's quest for iron in China has been a dismal failure and for many years she has been seeking her supplies from other sources.

The exportation of Indian pig to Japan at rates lower than those prevailing in India, has materially assisted the infant Indian iron and steel industry to maintain itself on a profitable producing basis. But even this supply is insufficient to meet the ever growing demands for cheap raw material for the Japanese steel mills. Some idea of what China has lost is seen in the closing of a recent contract between a group of Japanese manufacturers and the Australian Iron & Steel, Ltd., in which Japan agrees to take 150,000 tons of ore the first year, 300,000 tons the second year, 500,000 tons the third year and thereafter progressively until the total reaches 1,000,000 tons a year. The agreement being for 12 years, it would make the total contract about 10,000,000 tons. The placing of this order in China through the Han-Yeh Ping Company would have spelled prosperity for the company and work at good wages for thousands of unemployed in the Tayeh district. China's loss is Australia's gain. The Australian deposits at Yampi Sound on the northwest coast of Western Australia, contain some of the purest iron in the world and there are over 100,000,000 tons available on the side of a hill by simple quarrying. Docks are to be built at the foot of the hill and the ore will be shot by gravity direct from the workings into the holds of the steamers. Within a month after closing the above deal, comes the further announcement that the Japanese are negotiating with the New Zealand authorities for the purchase of an iron mine capable of producing all of Japan's iron requirements for many years to come.

Foster Bain, the eminent American mining authority, in his exhaustive study of the coal and iron resources of the Far East, issued last year by the Foreign Policy Association of New York, emphasized clearly that neither China or Japan, could ever hope to build up a modern industrial civilization based on iron and steel and become a menace to Europe and America, simply because they lacked the essential supplies of raw material upon which such a civilization must be founded.

China has relied upon her unlimited resources of cheap labor to overcome outside competition and hold her own when she got ready to undertake her industrial development, but while she is dreaming about her future, the march of modern engineering is teaching the rest of the world that production costs in the future will be determined entirely by skilled mechanics and not by brute labor. When China gets ready to enter the race, she will find that her neighbors have out-distanced her by the application of modern methods which will make impossible any competition from her masses of unskilled, undisciplined and poorly paid labor. While China fights and dreams of her future, Japan is scouring the Seven Seas for available sources of iron to maintain her growing industries, and, unless China discovers in the Altai or some other

inaccessible place within her own borders, new supplies of rich iron ore, she can kiss good-bye to her present dreams of erecting great iron and steel mills, locomotive and car works and industrial plants designed to supply her own requirements in the reconstruction and development of her resources.

Sun Fo's Stupendous Task

(Continued from page 493).

Minister Sun Fo can do nothing to carry forward his reconstruction plans without the whole-hearted co-operation of his colleagues and those members of the Nationalist Government who hold position and wield power by reason of their command over large military forces. These military leaders are also faced with a serious problem. The disbandment of their forces in most cases, means the loss of their influence. Disbandment cannot safely be carried out without the wherewithal to pay the troops. It is a vicious circle which can be broken only by stern action and a supreme sacrifice of self for the good of the country. Either the armies of China must go or the Chinese must work out their own salvation and reconstruct their country without foreign financial assistance. No progress is possible until the railways are brought under the supreme control of the Minister of Railways, even though in the subsequent allocation and distribution of the revenues, the lion's share for some time to come, goes to the military leaders. The fundamental principle of civil authority must be accepted and put into practice. This is the first step towards the rehabilitation of the existing railways and a restoration of China's credit abroad. With each further step forward in extending the civil authority; with each sign of progress towards the ultimate goal of representative government, foreign confidence in the good intentions of the new régime will wax stronger and the way paved for the influx of new loans that will usher in reconstruction and a new era for China.

Japanese Air Brake Makers Active !

The policy of the Department of Railways is to buy domestic materials as much as possible, and recently has been buying considerable quantities from Nippon Air Brake Company, Mitsubishi, etc. In Japan there are only a few makers in this line at present and there is practically no competition in government tenders. At present Westinghouse, G.E., etc. are getting a fair share of this business, but in future preference will be given to domestic products. Air brakes of the Nippon Air Brake Company are manufactured according to the model of Westinghouse and the quality is equal to the imported products. ("Kogyo Shimbu").

Mackay Radio Corporation Seeks P. I. Franchise

The Mackay Radio and Telegraph Company, of New York, has recently taken formal steps to obtain a license from the Philippine government to install and operate super-powerful radio communications with the United States and through its connections with the rest of the world. The company desires a fifty year franchise. It is understood that the Mackay Company desires to erect and maintain a chain of wireless stations across the Pacific ocean and to provide the necessary communication service between the Philippines and the United States. Stations are to be erected at intermediate points in order to insure rapid communications and to provide continuous and uninterrupted connections.

It is believed that the rapid economic development of the Philippines during the past few years has created an increasing demand for faster, more efficient and reliable communication service between the Philippines and the outside world. At the present time no one is able to forecast the success of the company in obtaining its franchise.

Japan's Shipbuilding Revival

Steamships Aggregating 250,000 Tons Under Construction, Including Diesel-Engined Liners and Freighters

Keen Competition for the Pacific Trade

THE recent launching at the Nagasaki Works of the Mitsubishi Dockyard and Engineering Company of the 16,000 ton Motor Liner "Asama Maru" for the Nippon Yusen Kaisha, draws attention to a spectacular revival of shipbuilding in Japan and a renewal of the struggle for trade supremacy on the Pacific. The signing of the Washington Treaties for the Limitation of Armaments was followed by an immediate and disastrous depression for Japan's shipbuilding industry, tremendously expanded by the War, which culminated last year in the Suzuki crash which severely hit the great Kawasaki Dockyard, Japan's second largest engineering plant. Two years ago, Japan's shipbuilding industry was moribund; today, orders for at least 22 new motor-driven ships, totaling nearly 250,000 tons, are on the books of the leading shipbuilding firms.

The bulk of the new Japanese tonnage is for the Nippon Yusen Kaisha and Osaka Shosen Kaisha to replace the older ships on their more important foreign services. These vessels are being built under the usual government subsidy which has made it possible to keep the work in Japan for the benefit of the home dockyards. It is understood that British and Continental shipbuilders made exceptionally low bids to secure this business, but the urgent necessity of doing something to stimulate the Japanese industry, kept the work at home. The European builders are, however, hoping to get some of the orders which must soon be placed for the replacement of the Japanese freighters whose building is unaffected by the government mail subsidies. The new building program of the N. Y. K. providing for three new 16,000 ton Diesel-engined liners for the Orient-California run, with an additional three motor ships for the Orient-Seattle run and two more for their European service, undoubtedly had much to do with influencing American legislation for encouraging the Merchant Marine.

The New Dollar Fleet

Fortunately, the Merchant Marine Act passed by Congress last session, provided for government subsidies and other aid which has at last made possible the building of an up-to-date American merchant fleet in the Pacific, where it is most urgently needed. Under the provisions of this act, the American Government will furnish loans to the shipbuilders up to seventy-five per cent. of the cost of construction at a low interest rate of 2½ per cent. a year for twenty years, the total not to exceed \$250,000,000.

With its usual characteristic enterprise, the Dollar Steamship Company set to work immediately to take advantage of the new law by preparing plans for building a complete new fleet. These plans have now taken concrete form in proposals for four new passenger steamships and although the tonnage, speed, and other particulars are at present withheld, their cost is announced to be \$7,000,000 each, a total of \$28,000,000. Under the terms of the Dollar Company's new mail contract with the American Government, the first of these new steamships must be completed and on the run within three years. It will take at least two years to complete the first vessel and the others will follow as rapidly as possible.

The only important detail that has not been fully determined is the manner of propulsion. It is intimated that preference will be given to the turbo-electric drive, patterned after the Panama-Pacific Company's new liner, the "California," now plying between San Francisco and New York. The Dollar Company announces that its new building program will be extended to cover its round-the-world liners as well. Simultaneous with the announcement of the Dollar program, comes the information that the Canadian Pacific Ocean Services has placed an order for another

21 knot "Empress" liner with the Fairfield Shipbuilding Company of Govan, Scotland.

Trans-Pacific Passenger Traffic

The competition between the premier American, Japanese and British Trans-Pacific ocean services for the passenger traffic, invites attention to the remarkably slow growth of this business. During 1921, Trans-Pacific steamers carried a total of 73,547 passengers of all classes to and from Pacific Coast ports, while in 1927 the total was 75,158, an increase of 1,600 in seven years. Of this

number, 20,425 were first class passengers in 1921 and 17,951 were first class in 1927. This has been contrasted with the half-million or more American tourists who annually make the pilgrimage to Europe and every effort is being made by American, British and Japanese to divert some of this flow across the Pacific. Undoubtedly, these efforts will bear fruit as soon as China becomes once more safe for tourist travel, for the average traveler to the Far East makes it a point to cover China and Japan in his tour. American tourists are now spending about \$28,000,000 a year in the Far East and the



Perspective Drawing of the 16,000 Tons Trans-Pacific Motor-Liners for the N.Y.K.



Motor Ship "Chojo Maru" Built by the Mitsubishi Company for the O.S.K., Gross Tonnage 2,500 Tons

Japanese are insisting upon a greater co-operation amongst the shipping firms, tourist's bureaus and hotels, while providing better facilities and accommodations to enable these visitors to enjoy their stay in Japan. In this campaign, they are working in close harmony with the Dollar and Canadian Pacific interests to start the flow of tourist travel across the Pacific. Although the competition for the business will be keen it is evident from the present volume of traffic, that the profits of the Trans-Pacific steamship lines of all nationalities must come from their cargo carrying capacity.

The N. Y. K. Program

Although it is too early to publish photographs and detailed descriptions of the various new ships under construction at the Japanese yards, some idea of the revival of the industry can be gathered from the following data compiled from the individual company and official records. The N. Y. K. program calls for the expenditure of \$40,000,000 for new ships in the next three years, of which \$18,000,000 represents the cost of the three new 16,000 ton liners for the California service. It will be noted that the costs of the new Dollar and the new N. Y. K. liners for the Pacific are approximately the same, the higher costs of the American ships being attributable to the increased labor costs in the United States.

The Orient-California Service

The three Motor Liners for this service are to be named the "Asama Maru," "Tatsuta Maru" and "Chichibu Maru," the first two to be built at the Nagasaki Works of the Mitsubishi Dockyard and Engineering Works and the third at the Yokohama Dockyard. The particulars are as follows:

Main Dimensions: Length between Perpendiculars, 560 feet, Length Overall, 584 feet, Moulded Breadth, 72 feet, Depth moulded to Upper Deck, 46½ feet; Gross Tonnage: 16,000 Tons (about) Accommodation: First Class, 200, Second Class, 100, Third Class, 400, Crew, 330; Speed: Trial, 19 knots, Economic Speed, 17½ knots; Main Propelling Engines: Two of the new liners the "Asama Maru" and the "Tatsuta Maru" building at the Mitsubishi Yards are to be fitted with four sets of 4,000 B.H.P. single-acting, two-stroke Sulzer Engines, type 8 ST-68, each with eight working cylinders of 680 mm. diameter and 1,000 mm. stroke-16,000 B.H.P. total. The "Asama Maru's" engines will be supplied by the Sulzer Works direct from Switzerland while the "Tatsuta Maru" will be fitted with the Mitsubishi-Sulzer Diesel engine to be built at their Nagasaki Works.

The Mitsubishi-Sulzer Engine

One of the outstanding features of the Mitsubishi Dockyard and Engineering Works is their construction of various high class machinery for which they hold the patent rights in Japan. In order to keep abreast with modern developments in shipbuilding, and being convinced of the superiority of the Sulzer type Diesel engine, they, some years ago, entered into an arrangement with Sulzer Brothers of Winterthur, Switzerland, whereby a manufacturing license for their patents were secured for Japan. One of the first big undertakings under the new arrangement was the



Type of Recent Motor Ship Built at the Mitsubishi Yards at Nagasaki for the Mitsubishi Trading Company
Oil Tanker "San Pedro Maru," 7,628 Tons

manufacture of two sets of 2,300 B.H.P. engines which were installed in the "Montevideo Maru," a motor ship built at the Nagasaki Works for the O. S. K. Four other sets of similar capacity and one of 2,000 B.H.P. have since been turned out, and others are in course of construction. The operation of the Mitsubishi-Sulzer engines on the "Montevideo Maru" have given wonderful results and the building of the four sets of 4,000 B.H.P. each for the N. Y. K. liner sets a record in big horsepower internal combustion engines in Japan.

The order for the third of these new N. Y. K. Motor Liners, the "Chichibu Maru" has been placed with the Yokohama Dockyard, the only difference in the details being that this vessel will be fitted with Burmeister & Wain Diesel engines of similar horsepower as the Sulzer type, mentioned above.

Orient-Seattle Service

The three steamers for this service are to take the place of the slower combined cargo and passenger ships now operating on that run. They are also to be fitted with two set of Burmeister & Wain engines totalling 11,000 B.H.P. Two of these ships are being built at the Yokohama Dockyard and the other at the Osaka Iron Works. The principal dimensions are: Length between Perpendiculars, 510 feet, Moulded Breadth, 66 feet, Moulded Depth, 41 feet, Load Draught moulded, 30-ft 2-in. Tonnage: Gross, 11,000 tons, Net 6,700; Capacities: General Cargo, 9,500 tons, Cargo Oil Tank, 650 tons, Refrigerating Space, 250 tons, Fuel Oil Tank, 1,900 tons; Accommodation: First Class, 82, Third Class, 260; Main Engines, Burmeister & Wain Double-Acting Four Cylinder Diesel Engines, two sets. Speed: Service, 15.75 knots.

Orient-South America Service

The Osaka Iron Works has also under construction for the N. Y. K. a 10,000 ton motor liner for its South American Service.

European Service

Orders for two new Motor Liners for the N. Y. K. European service have been placed with the Mitsubishi Dockyard and Engineering Works and will be built at their Nagasaki Works. Their dimensions are as follows: Length, Overall, 526 feet, Between Perpendiculars, 505 feet, Breadth Moulded, 63 feet, Depth Moulded, 37 feet, Loaded Draught, 28½ feet; Gross Tonnage, 11,200 tons, Net, 6,900, Deadweight Capacity, 10,000 tons. Accommodation: First Class, 125, Second Class, 69, Third Class, 60; Speed: Service, 17 knots. Engines each ship will be fitted with Mitsubishi-Sulzer type Diesel engines of 9,600 B.H.P. The motors are 10 cylinder units, with a bore of 680 mm and a piston stroke of 1,200 mm with a speed of 110 r.p.m.

Osaka Shosen Kaisha

This company has under construction nine new steamships aggregating 50,000 tons. Three new ships designed for the South American run of 9,417 gross tonnage each, are being built at the Nagasaki Works of the Mitsubishi Company. They will be equipped with Mitsubishi-Sulzer Diesel engines with a total of 6,400 B.H.P. each. Their speed will be 15 knots. The Kobe Works of the Mitsubishi Dockyard and Engineering Company are also building two 1,700 ton Motor Express



Type of Recent Motor Ship Built at the Mitsubishi Yards at Nagasaki for the Mitsubishi Trading Company
Motor Freighter "Columbia Maru," 5,611 Tons

Ships for the Inland Sea service of the O. S. K. The "Midori Maru," the first of these new so-called Beppu-liners is to be completed and placed on the run by the end of November. She can accommodate 46 First Class, 145 Second Class and 550 Third Class Passengers and measures 256 feet overall with a speed of 15 knots. Her sister-ship is to be called the "Sumire Maru."

The Yokohama Dockyard is building three Motor Ships for the O. S. K. designed for its Japan, India and Australia service. These are of 5,300 tons each, equipped with Burmeister & Wain Diesel engines generating 3,000 B.H.P. The speed is to be 14½ knots. The Uraga Dockyard at Yokosuka is also building the "Canton Maru" of 2,800 tons for the O. S. K.

Showa Kisen Kaisha

This new steamship company has inaugurated its building program by placing an order with the Uraga Dockyard for the "Kowa Maru" the first ship of its new fleet. This is to be equipped with a M. A. N. Diesel engine. Its length is 415 feet, Breadth, 56 feet, Depth, 31.9 feet. Gross tonnage, 5,800 with a deadweight capacity of 9,800 tons. The new vessel is expected to be launched next March and in service by May.

Other Construction

In addition to the 2,800 ton O.S.K. steamship mentioned above, the Uraga Dockyard is building two minor Warships and four other small freighters, one of 1,800 tons, one of 500 tons, one of 2,100 tons, a motor trawler and a dredger. The Uraga Dockyard has also booked the order for a 3,200 B.H.P. Motor ship for the Yamashita Kisen Kaisha, to be fitted with M. A. N. engines.

Other Mitsubishi Construction

The Mitsubishi Works, at Nagasaki, is also building two motor tankers for the Mitsubishi Trading Company. These vessels have a gross tonnage of 7,269 tons, net tonnage, 5,000 and dead weight capacity of 10,637 tons. They are being fitted with Mitsubishi-Sulzer engines having a total of 2,250 B.H.P. for each steamer. The "San Luis Maru," one of the above tankers was launched some time ago and is to be completed in December and placed on the Pacific run. Her length is 430 feet, breadth, 57 feet, with a speed of 13 knots. In addition, the Mitsubishi Company is building one 9,000 ton Motor ship for the Yamamoto Trading Company, equipped with Mitsubishi-Sulzer engines of 2,250 B.H.P. to produce a speed of 13½ knots. Another motor ship of 1,500 tons to the order of the Iden Kisen Kaisha will be fitted with a four cylinder Sulzer engine of 1,500 B.H.P. A 2,300 ton motor ship for the Ogura Shosen Kaisha, to be fitted with a Mitsubishi-Sulzer six cylinder, 2,300 B.H.P. engine is also under way at the Mitsubishi Nagasaki Yard. The Yamashita Kisen Kaisha has decided to build three Diesel engined freighters having a deadweight capacity of 10,000 tons each, the work to go to either the Yokohama, Uraga or the Mitsui Tama Yards.

Dairen Kisen's New Fleet

The Dairen Kisen Kaisha, a subsidiary of the South Manchuria Railway Company, operating in conjunction with the railway in its freight and passenger service from Dairen to other Far Eastern ports, has increased its capital from ten to thirty million yen and ordered two new 7,000 ton passenger steamships from the Mitsui Tama Shipyard, four 4,000 ton boats from the Osaka Iron Works and one 1,500 ton freighter from the Manchuria Dockyard Company of Dairen.

Mitsui Shipbuilding Program

The Mitsui interests are also forging ahead with their shipbuilding branch and have decided upon a definite policy of expansion in competition with the older dockyards. The Shipping Department of the Mitsui Bussan Kaisha is a very active concern owning a fleet of 31 steamships with a total of 170,000 tons and operates 18 vessels under charter. During the war, the Mitsui interests built the Tama Shipbuilding Yard at a cost of Yen 14,000,000 and shortly after its completion came the post-war depression and then the limitation of armaments agreement, which practically compelled it to close down. A turn for the better has begun to set in and now that the outlook is brighter, the Mitsui interests

have decided to build at the Tama Yard two new large Diesel engined freighters for their own fleet, of 9,800 tons each. The first of these motor freighters, the "Hakubasan Maru" was recently launched. She is equipped with Burmeister & Wain Diesel engines, is 435 feet long and has a speed of 15 knots. Her sister-ship is to be named the "Hakonesan Maru."

On the completion of the above steamers, the Mitsui plan to build five more freighters of 3,800 tons each. These eight ships represent the first period of the new Mitsui building program, the ships to be placed in the Trans-Pacific freight service. The second period includes the building of several large freighters for the Panama and Trans-Atlantic service. The Mitsui yard holds the distinction of having constructed in 1924, the first motor ship built in Japan.

Mitsui Shipbuilding Yard

As noted above, the Tama Shipbuilding Yard has also booked the orders for the two largest of the new fleet for the Dairen Steamship Company and a brief outline of its plant will help to an appreciation of the position it holds in the Japanese industry. Although a newcomer in the field, the powerful financial interests behind it, will cause it to forge ahead if there is the slightest chance that the present revival of the industry can be made permanent.

The Tama Shipbuilding Yard has a large tract of land and plans for further extension. The yard is divided into two sections, that is, shipbuilding and engineering. It has two dry docks, with dimensions as follows:

	Length	Breadth	Largest Ship Accommodated
No. 1 Dock	480 ft.	74 ft.	15,000 tons d.
No. 2 Dock	350 ft.	47 ft.	5,000 tons d.

The yard has four building berths, of the following sizes:

	Length	Breadth	Largest ship to be built
No. 3	200 ft.	60 ft.	small ships
No. 4	600 ft.	80 ft.	15,000 tons d.
No. 5	600 ft.	80 ft.	15,000 tons d.
No. 6	450 ft.	70 ft.	7,000 tons d.

Berths Nos. 4 and 5 are of reinforced concrete and, if extended each will be capable of accommodating a merchantman or warship weighing more than 30,000 tons. This equipment enables the yard to receive orders for new ships ranging from 60,000 to 100,000 tons a year.

There is a large berthing quay wall with a length of 1,200 feet and depth of 25 feet. It is able to accommodate ten large ships at a time. The yard now employs 1,700 workmen. According to investigation of April 1926, 30 ships with a deadweight tonnage of 115,000 have been built there since its establishment. The yard owns patent rights for Japan Proper, Korea, Formosa, Saghalien and Manchuria for the manufacture and sales of Burmeister Diesel engines.

Other scattering orders for small steam tonnage is also under construction at the various Japanese yards. According to the latest report of the Kobe Shipping Exchange the independent shipping companies of Japan now possess 18 vessels equipped with Diesel engines, representing 137,135 tons as follows:

- "Akagisan Maru," 6,981 tons, owned by the Mitsui.
- "Florida Maru," 9,114 tons, owned by Kawasaki.
- "San Pedro Maru," 10,637 tons, owned by Mitsubishi.
- "Yahiko Maru," 9,109 tons, owned by Itatani.
- "Kuramasan Maru," 3,202 tons, owned by Mitsui.
- "Santiago Maru," 10,600 tons, owned by Mitsubishi.
- "Takamisan Maru," 3,145 tons, owned by Mitsui.
- "Shunten Maru," 9,100 tons, owned by Yamamoto Shoji Kaisha.
- "Shigisan Maru," 8,050 tons, owned by Mitsui.
- "Fukko Maru," 6,042 tons, owned by Kobe Steel Works.
- "Cuba Maru," 9,113 tons, owned by Kawasaki.
- "Olympia Maru," 9,173 tons, owned by Mitsubishi.
- "Koyasan Maru," 3,203 tons, owned by Mitsui.
- "Columbia Maru," 9,173 tons, owned by Mitsubishi.
- "St. Louis Maru," 10,600 tons, owned by Mitsubishi.
- "Tatsutasan Maru," 3,144 tons, owned by Mitsui.
- "Taihei Maru," 9,200 tons, owned by Shitani.
- "Daijin Maru," 7,550 tons, owned by Taiyo Maritime Transportation Co.

The Development of Manchuria

The South Manchuria Railway Company Invites Foreign Capital to Share in its Subsidiaries,
Guaranteeing a Profitable Return on the Investment and Protection to Lives and Properties

FOREMOST in development work for the coming year in the Far East is the South Manchuria Railway with its budget estimates of Y. 49,600,000, an increase of Y. 13,600,000 over the previous year's expenditures. Some idea of the extensive activities of this Japanese enterprise, can be gathered from the following itemization of the above estimates :

Railway Department	...	...	...	...	...	Y.16,300,000
Railway Workshop (Shakako and Liaoyang)	...	...	...	...	...	260,000
Harbor	...	...	...	...	...	8,300,000
Mining	...	...	...	...	...	6,700,000
Oil Shale Industry	...	...	...	...	...	2,000,000
Iron Manufacturing	...	...	...	...	...	4,200,000
Land	...	...	...	...	...	2,800,000
Miscellaneous	...	...	...	...	...	4,000,000
Reserve fund	...	...	...	...	...	5,000,000

Some of the more important items under the above heads are :

RAILWAY

Double Tracking costs (continued)	...	...	...	...	Y.1,000,000
Rail Replacement (continued)	...	...	...	...	2,500,000
Rail Track improvement (continued)	...	...	...	...	1,300,000
New building for Kaiyuan Station (continued)	...	...	...	...	600,000
For construction of automatic signals (between Tashih-chiao and Liaoyang)	...	...	...	...	600,000
Equipments for Yingkou Wharves	...	...	...	...	300,000
Rail motor cars	...	...	...	...	230,000
New goods cars and reconstruction of goods cars (470 in number converted on 30 ton car basis)...	...	...	...	...	3,800,000

To the above are added the construction and repair of telephone lines, installation of automatic telephones, erection of goods sheds at Liaoyang and Tashihchiao, building of over-bridges at Anshan and Haicheng.

HARBOR

Kanchingtzu coal pier construction (continued)	...	...	...	...	4,000,000
New warehouses on Dairen Wharves	...	...	...	...	1,000,000

Besides reclamation of Russia-machi and Shokoshi Shore front (continued) and completion of berth on Fourth Wharf.

MINING

New blast-furnace for increasing the output of pig iron to the total amount of 400,000 tons at Anzan Iron & Steel Works and Supplementing of other requisites.

Open cut mining installations	Y.4,000,000
-------------------------------	-----	-----	-----	-----	-------------

MISCELLANEOUS

Building of new dwellings	...	...	...	...	Y.1,600,000
Erection of warehouse for stores on Dairen Wharves...	...	...	...	...	1,500,000

ESTIMATE OF BUSINESS RECEIPTS AND EXPENDITURES

Receipts	...	...	...	...	Y.247,000,000
Expenditure	...	...	...	...	211,000,000
Balance	...	...	...	...	36,000,000

ESTIMATE RECEIPTS

Railway	...	...	...	...	Y.122,000,000
Harbor	...	...	...	...	10,000,000
Mining	...	...	...	...	92,000,000
Steel manufacturing	...	...	...	...	10,000,000
Land	...	...	...	...	6,000,000
Interest account	...	...	...	...	4,500,000
Miscellaneous	...	...	...	...	1,300,000

The estimated receipts for the next fiscal year, compared with the current year's, are placed at Y.4,500,000 more. They will be submitted to the Finance Ministry early in November.

One of the most important features of the S. M. R.'s activities is the program for double-tracking the entire line from Dairen to Changchun, thus making it the only double-track railway in this part of the world. The program was initiated to facilitate the transport of coal between Fushun and Dairen but owing to the phenomenal increase in the volume of bean shipments it has been extended to the entire line. To date, the line has been double-tracked as far as Ssuningkai and work is now being pushed forward northwards over the last section to Changchun. The sum of Y.1,300,000 has been set aside for this item during the next fiscal year. The old 60 and 80 pound rails are being replaced with 100 pounders and heavier bridging and other engineering work is involved to meet the increased weight of trains. At present, these heavy trains are confined to the section between Mukden and Dairen, but with the completion of the double-track system and installation of heavier bridges on the section to the north, the service will be extended to cover the entire line. This will enable the S.M.R. to keep pace with the ever increasing demands upon its capacity and increase its traffic receipts accordingly.

Naturally, the S. M. R. is endeavoring to build its bridges and rolling stock as far as possible at its own works at Shakako, but some of the business has been placed as a matter of policy with the larger Japanese locomotive and car builders. The Shakako Railway Shops are experiencing a busy time filling the orders for the line. For the current fiscal year, 19 new locomotives are to be built, of which six are passenger locomotives of the "Percival" type and thirteen are freight locomotives of the "Mikado" type. In the distribution of these orders, the Shakako Works are to build six locomotives each of the above types ; three of the freight locomotives are to be built by the Kawasaki Dockyard and four by the Nagoya Railway Car Manufacturing Company. According to the "Manchuria Daily News," the estimates of cost for building these locomotives at Shakako, is Y. 97,000 per unit or a total of Y. 1,164,000 for the twelve, while the locos built by the Nagoya and Kawasaki Works will cost Y. 131,000 each or Y. 917,000 for the seven ordered. The higher costs of manufacturing in Japan is ascribed to the business tax in that country, added to customs duty, interest, dividends, shipping and trial run costs. The per ton estimates of the Shakako Works for these locomotives compares favorably with the costs of the narrow-gauge locomotives turned out by the workshops of the Imperial Japanese Government Railways. In addition, to the above, the Shakako Works are building four passenger locomotives for the Chinese Ssuningkai-Taonan line to be completed within the coming year. This was part of the order for twelve locomotives, placed by this line some months ago, when the contract for the remaining eight went to the Skoda Works.

Another highly important engineering work is being carried out by the South Manchuria Railway across the bay from Dairen

(Continued on page 510).

Kuala Lumpur Power Station

THE new Government Power Station at Bungsar Road, Kuala Lumpur, may be taken as representing modern standard practice in power-station design in the Federated Malay States.

It may be pointed out first that the climate in this region is excessively hot and damp—the average shade temperature is about 95° F. and humidity reaches nearly 100 per cent.—and special precautions were, therefore, taken in designing the electrical plant to meet these conditions.

As the contract covered erection and maintenance it may also be worth while pointing out that the power station is located about two miles from the town of Kuala Lumpur, and 28 miles from Port Swettenham, where the material had to be landed, and thence transported to site by metre gauge railway.

In a country such as this, where it is not possible to obtain skilled operators in every section, reliability and simplicity are of very great importance, especially when considering a public supply, and for these reasons the Crown Agents' Consulting Engineers were very careful in the selection of plant and apparatus.

Water conditions on the site are not ideal, and may present a difficulty when the generating plant is doubled, as is expected ultimately; but for the present, water for condensing purposes will be obtained from two ponds having a total capacity of approximately 20 million gallons. These ponds are connected together by open reinforced concrete flumes; the suction and discharge flumes run in front of the condensers the whole length of the station. For boiler feed purposes, special tanks are used for settling and treating the water if necessary.

The plant building, which is approximately 185 feet long by 177 feet wide, is divided into four bays—the switchgear and transformer bay, the turbine bay, the boiler bay, and the coal store bay. The last-named is unusually large, as it was necessary to provide ample space on account of the bad storage properties of local fuel.

There are four boilers of Babcock & Wilcox cross drum type, each capable of evaporating 32,000 lb. per sq. inch and at a temperature of 650° F. when fired with local coal of about 9,000 B.T.U. per lb. All boilers are arranged for oil firing in case of emergency, but the oil supply system has not yet been installed.

The stokers are of the compartment type so that air can be admitted to any part of the fire, and properly controlled by adjustable dampers. Each pair of boilers is provided with one chimney and two motor-driven induced draught fans on a platform above the economizers. These fans have a capacity of 54,000 cubic feet per minute.

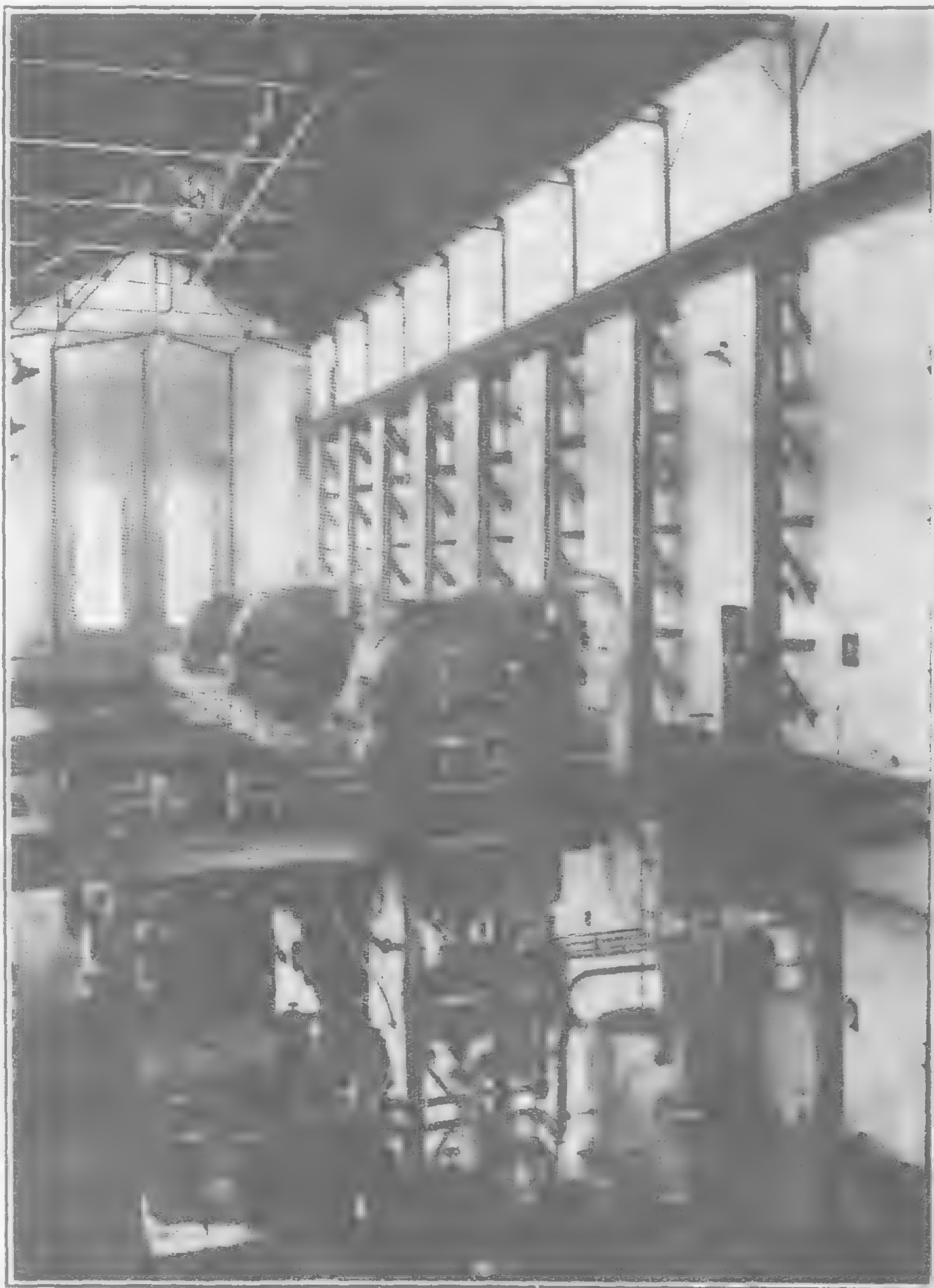
The forced draught fans are situated in the basement and each has a capacity of 24,000 cubic feet per minute and a maximum air pressure of 3 inches of water.

Motor driven coal elevators raise the fuel from hoppers in the coal store and automatically regulate the supply to the furnaces.

The main steam range runs along the back of the boilers a few feet above floor level; from the range, main piping runs down to the separators in the turbine basement and up again to the turbine stop valves, thus forming a deep U-shaped connection between boilers and turbines.

In the turbine bay the present installation includes two B. T. H. turbo-alternators of 4,000 kw. capacity each and one of 1,000 kw. capacity; but provision has been made for the future addition of two 500 kw. sets. The foregoing are the normal ratings of the present machines at 80 per cent. power factor, and each is capable of sustaining a 25 per cent. overload for two hours.

The smallest turbine is a 6-stage machine and the other two are 9-stage machines; in each case there are two rows of buckets in the first stage and single rows in the remainder. The steam conditions are 240 lb. per square inch at the stop valve, 650° F superheat, and 27.25-in. vacuum, the



Turbine Bay in Kuala Lumpur Power Station, Showing Two 4,000 kw. and One 1,000 kw. B.T.H. Turbo-Alternators

guaranteed steam consumption figures being as follows :—

Percentage of Full Load	Lb. per B. T. U.	
	4,000 KW. Set	1,000 KW. Set
100 per cent	11.85	13.40
75 ,,	12.20	14.25
50 ,,	12.90	15.65
25 ,,	15.03	20.00

It will thus be seen that the larger set running at half load is more economical than the smaller set running at full load, justifying the modern tendency towards the employment of larger generating units.

Each turbine is direct coupled to an alternator running at 3,000 r.p.m. and generating three-phase current at 6,600 volts 50 cycles. Ventilating fans are arranged at each end of the rotor, and in the case of the 4,000 kw. machines a separate water-cooled air system is provided, forming a self-contained closed system; but in the case of the 1,000 kw. machine the ventilating air is drawn from outside the building and passed through a viscous type filter.

Each turbine is provided with a surface condenser built by Hick, Hargreaves, and



General View of Kuala Lumpur Power Station



Boiler House in Kuala Lumpur Power Station: The Four B. and W. Boilers are Designed for Coal Firing but can be used for Oil Firing in Cases of Emergency

capable of maintaining a vacuum in the turbine exhaust of 27.25 inches, with 5,900 gallons of cooling water per minute in the case of 4,000 kw. sets, and 1,700 gallons per minute in the case of the 1,000 kw. set when the water is supplied at a temperature of 88° F.

A central steam air ejector is provided for priming all the circulating water pumps and exhausting air from the highest points of the circulating system generally.

Current from the alternators is taken to banks of Johnson & Phillips' power transformers and stepped up to 11,000 volts for transmission to the central sub-station and the overhead ring main. This high-tension transmission, however, will ultimately be changed to 33,000 volts.

All the present power transformers are delta connected on the primary or 6,600 volt side, and star connected on the secondary or 11,000 volt side, and as the alternators are wound for star connection a star-delta-star system is obtained. Separate earthing resistances are provided for the neutral point of the machines and the 11,000 volt star winding of the step-up transformers. Tappings are provided on all transformers so that the secondary pressure can be adjusted to 2½ per cent. or 5 per cent. above or below the normal value. All alternator transformer units

are protected electrically by the balanced current system. The 11,000 side of the transformers is connected direct to the E.H.T. switchgear enclosed in cubicles constructed of concrete slabs, specially moulded to accommodate through connections, built into steel framework, and fitted with steel doors securely interlocked.

This switchgear controls the three alternator-transformer groups, three out-going overhead and two underground feeders of 3,000 KVA. each, station auxiliary transformers, lightning arrester equipment, etc., with spare cubicles for extensions.

The main oil switches are remote electrically operated with a continuous rating of 300 ampères, and a breaking capacity of 150 KVA. Each phase is contained in a separate oil tank with ample space above the oil to allow for additional moisture condensation possible in this country.

In front of the H. T. cubicles is situated the control board which contains all the operating

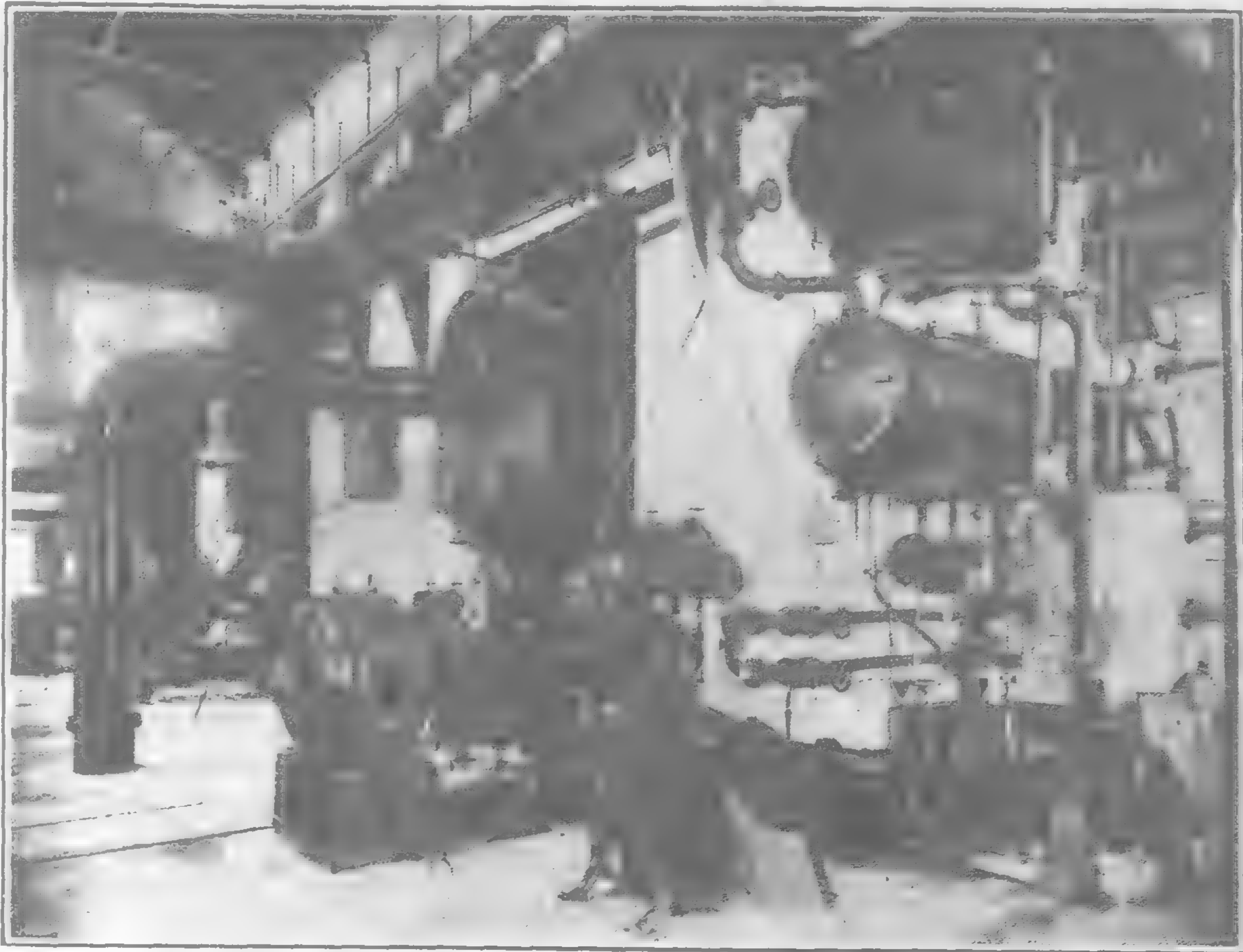


Transformer Bay in Kuala Lumpur Power Station, Showing J. and P. Power Transformers Fed at 6,600 volts by the B.T.H. Turbo-Alternators and Stepping up to 11,000 volts for Transmission Lines

gear, recording instruments, relays, etc. Only low voltage current supplies this board, and the interlocks are so arranged that no portion of the H. T. gear can be accessible while alive. The main oil switches are closed by passing low voltage current from a battery through their closing solenoids.

On the switchboard gallery also are the field suppression panels, earthing switches, field control switches, motor-generator and battery control board.

The field suppression panels contain one automatic main field circuit-breaker with loading resistance; the circuit-breaker is arranged to open automatically whenever the corresponding main alternator-transformer oil switch is tripped through the medium of the protective relays, but not when it is opened by hand. The breaker is enclosed behind a glass door so that the door must be deliberately opened or the glass broken before it can be opened by hand. The earthing switches are of the oil-immersed, single pole, non-automatic type, mounted on pedestals, and capable of carry-



Condensing Plant in Kuala Lumpur Power Station: Showing B.T.H. Squirrel Cage Motors Driving Circulating and Extraction Pumps



B.T.H. High Tension Switchgear and Battery Control Panels in Kuala Lumpur Power Station



B.T.H. Control Switchboard in Kuala Lumpur Power Station

ing for a short period the same maximum current as the respective earthing resistances.

A chloride electrical storage battery is used for supplying current to the main oil switch solenoids, the control board signal lamps, station emergency lighting circuits, and for field stabilising in the alternators.

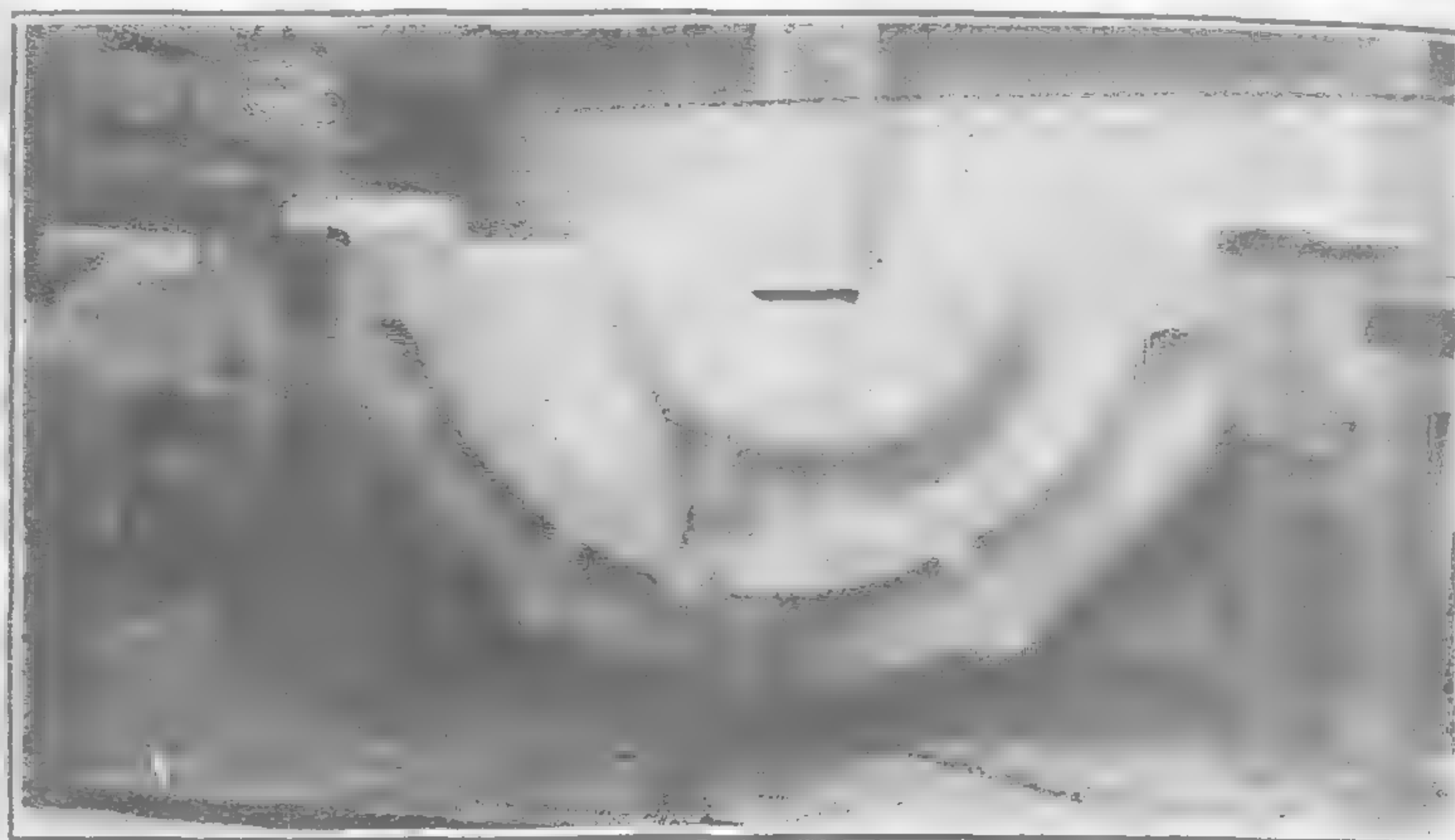
Outgoing from the power station are two 0.15 sq. inch 3-core, 11,000 volt, armored cables, carrying current to the central sub-station in Gombak lane. This sub-station feeds the existing D. C. underground network, as well as the static sub-stations supplying the residential areas out to a radius of approximately 2½ miles.

From the power station goes also an overhead 11,000 volt feeder consisting of 0.15 sq. inch stranded copper, carried on Callenders Kay type towers. This line is about 12 miles long, and passes round the east side of Kuala Lumpur at a radius of

approximately 3½ miles, terminating at the Railway Central Workshops. From there to the central

sub-station an existing line was raised to 11,000 volts, thus completing the ring main.

The object of this overhead line is to feed areas outside the ring up to a distance of about six to eight miles. It is also a simple matter to step up the pressure to 33,000 volts, and by so doing reach farther afield. In fact the line equipment and insulation are already suitable for this higher pressure.



Figures 2-3.—Planing the Top and Bottom Half Casing of the B.T.H. 20,000 kw. Turbo-Alternator for the I.J.R.

Japanese Railway Electrification

Japan is Still Forging Ahead with Her Railway Electrification Plans

THE Ministry of Railways has decided upon the electrification of nine sections of five trunk railway lines, at an estimated cost of Y.40,000,000, over a period of six years.

The new plan to go into effect next year is to electrify all of the sections of the railway throughout the country that are spotted with tunnels or heavy grades and is the result of long studies, the project being based upon the original purpose to electrify all trunk lines situated near large cities. The different sections affected by the plan with their respective estimated costs are as follows:

Section	Trunk Line	Estimate (000 omitted)	Completion Construction Period
Tottori-Toyooka, Sanin	Y.3,880	1934
Maibara-Imajo, Hokuriku	4,000	1933
Fukushima-Yonezawa, O-U Line	3,470	1933
Otsu-Akashi, Tokaido Main Line	13,682	1934
Atami-Numazu, Tokaido Main Line	2,490	1932
Kokubunji-Hachioji, Chuo Central Line	1,317	1930
Hachioji-Kofu, Chuo Central Line	3,780	1930
Akabane-Omiya, Tohoku Line	5,368	1931
Ochanomizu-Kameido, Sobu Line	1,701	1932

The plans include the construction of a new electric line connecting the present Ochanomizu Station of the Yamanote line, which is the inner hoop of the line encircling Tokyo, with the Ryogoku Railway Station, the terminus of the Boso and Hojo lines, and of laying parallel tracks between Ryogoku and Kameido, together with their electrification. The estimate of the cost of construction is over Y.4,000,000. The distance affected is 2,400 meters and is to be an elevated railway. The plan involves the construction of a new steel bridge of 169 meters over Sumida River and reconstruction of the two bridges of Izumibashi and Kandagawabashi follow with Large Turbo-alternator for Japan.

20,000 B.T.H. Turbo-Alternator

The accompanying illustrations show machining operations being carried out on the 20,000 kw., 6,600 volt, three-phase, 50 cycle turbo-alternator

which are being built by the British Thomson-Houston Company to the order to Messrs. Mitsui & Co., Ltd., for the Imperial Government Railways, Japan. Figure 1 gives a view of the alternator rotor forging in the special machine which is used to mill the slots for the electrical windings.

The rotor, as illustrated, consists of a fluted shaft with core plates about 2 inches thick shrunk on so that they are still a tight fit when the rotor is run at overspeed. With this form of construction all the forgings are relatively small so that the possibility of forging defects is eliminated as far as possible. The weight of the assembled rotor forgings, as illustrated, is 22 tons.

Figures 2 and 3 show the top and bottom half exhaust casings being planed, and in Figure 4 the complete exhaust casing is seen being bored out ready to accommodate the steam rotor.

25,000 kw. Steam Turbine for the Tokyo Electric Light Company

Although at their various important receiving stations, the Tokyo Electric Light Company has a number of synchronous condensers, when the company purchased a third 25,000 kw. steam generating unit for the Senju Station, which is a steam stand-by station located just outside of the city of Tokyo, it was decided that the two units now installed there and the new unit should be arranged that during the season when there is an abundance of water power, the generators of the steam driven sets could be disconnected from the turbines and operated as synchronous condensers to improve transmission conditions. This will be the first steam stand-by station in Japan to be so arranged.

The order for the new unit was placed with the Westinghouse Electric International Company, and the unit, which is to be a duplicate of the two sets now installed at the Senju Station, is to be built at the South Philadelphia Works of the Westinghouse Company.

The turbine is to be of a combination semi-double flow type designed for a steam pressure of 225 pounds (gauge pressure), 200 degrees Fahrenheit superheat, 28.5 inches exhaust vacuum and to operate at a normal speed of 1,500 r.p.m. The generator of the unit will

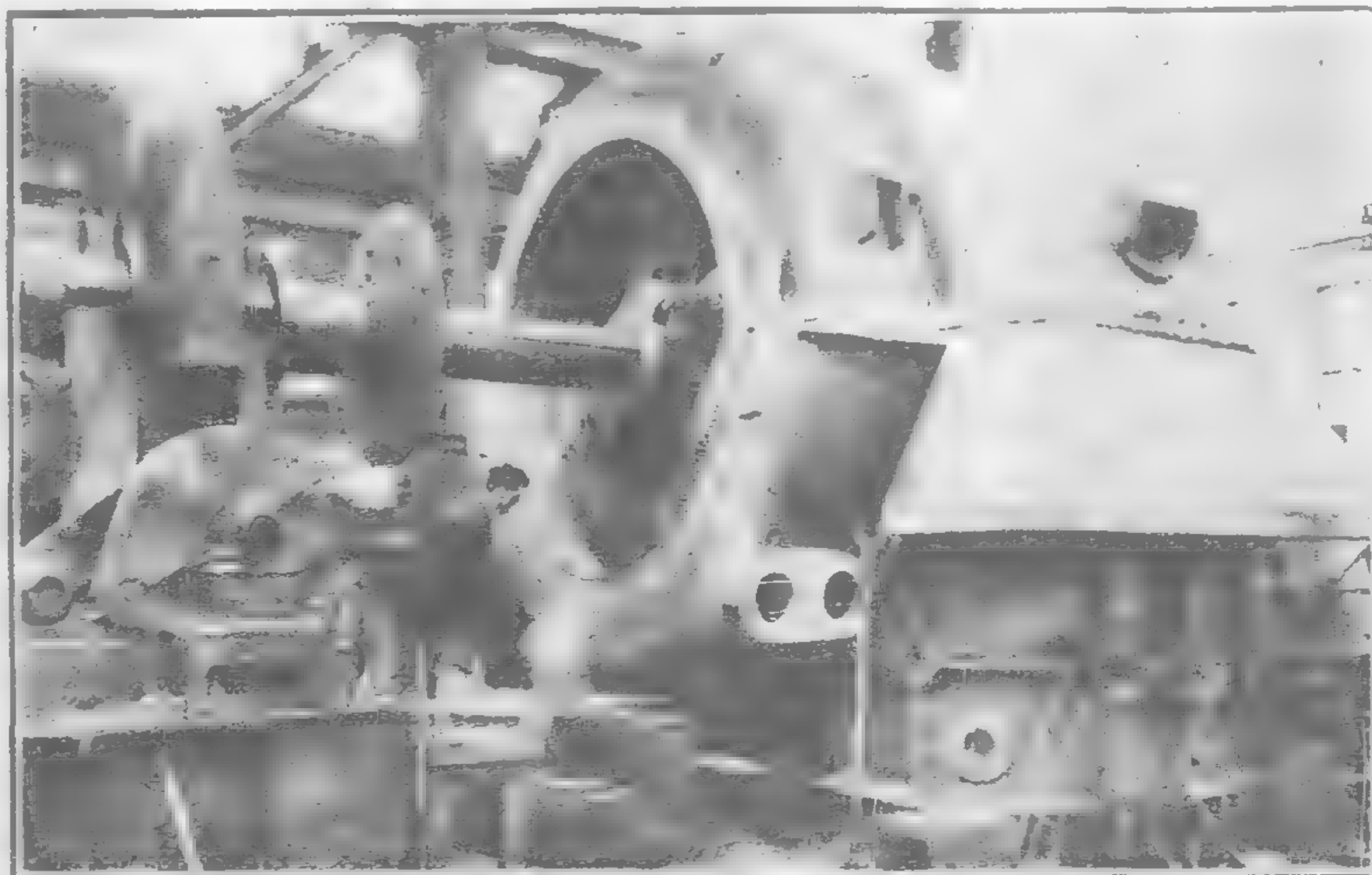


Figure 4.—The Rotor of the 20,000, B.T.H. kw. Turbo-Alternator

be rated at 25,000 kva., 11,000 volts, 50 cycles, 1,500 r.p.m.

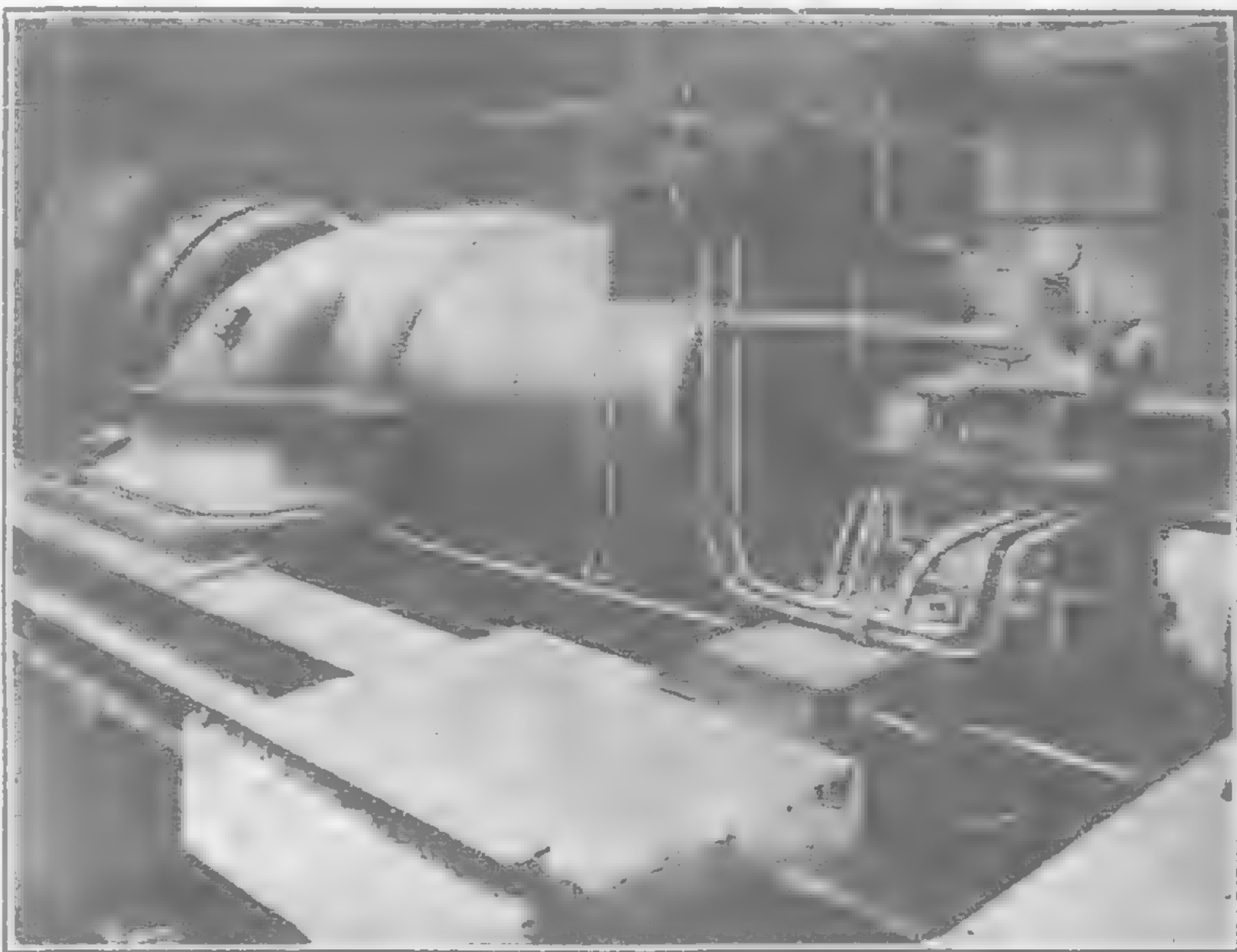
The unit will be connected to the system through three 8,500 kva. single phase, three winding type transformers with 11 kilo-volt primaries, delta connected, with star connected tertiary and secondary windings for supplying the 21 kilo-volt and 66 kilo-volt distribution systems that extend around and throughout the city of Tokyo.

Since the boilers at the station usually will be shut down during the season when the units are not needed for the generation of power, it was necessary to provide means of starting the generators when they are disconnected from the turbines to be operated as synchronous condensers. Various methods were considered, but it was decided finally to arrange to start each machine singly as a synchronous motor by means of power from a 10,000 kv-a., a-c.-a-c. motor generator. By this method, the machines can be started without causing a disturbance in the transmission system. Each generator also is to be equipped with a high pressure oiling system that will provide a means of lubricating the machines before the rotors are turning over.

When operated as a synchronous condenser, each generator will have a capacity of 20,000 kv-a. zero per cent. leading power factor. By the operation of a special disengaging coupling mounted between the turbine and generator of each unit, the generator can be disconnected from the turbine while the unit is running idle. In construction, this coupling is very simple. It consists of three principal numbers; each of two of these numbers are built to resemble the two halves of a stand pin-type coupling except on the turbine half is a sleeve that extends from the driving face toward the generator. These two parts are keyed to the shafts of the generator and turbine, and the third member of the coupling which consists of a movable collar and driving pins is mounted on the sleeve that protrudes from the turbine half. Two sets of driving pins extend out, one set on either side, of this collar. The set towards the turbine is longer



Figure 1.—Machining the 20,000 kw. Turbo-Alternator for I.J.R. at the B.T.H. Works at Rugby



10,000 kw. B.T.H. Turbo-Alternator for the North Point Power Station of the Hongkong Electric Company



Fabricated Frame for the Turbo-Alternator Being Built in the Rugby Works for the Japanese Imperial Government Railways

and cannot be withdrawn from the holes in the turbine half coupling when in either in the driving or idle position. The other set of pins is on the side of the collar toward the generator and can be withdrawn from the holes in the generator half of the coupling thus disengaging the two machines. The collar is moved along the sleeve by a yoke operated by a hand lever pivoted on the bedplate of the set.

10,000 kw. Turbo-Alternator for Hongkong

A 10,000 kw. Turbo-alternator which is being manufactured by The British Thomson-Houston Co., Ltd. Rugby, England, will shortly be installed in the North Point Power Station of the Hongkong Electric Co., Ltd.

The turbine will be a 16 stage High Pressure Super-efficient single cylinder impulse type machine and will be supplied with steam at 190 lbs. per sq. inch gauge pressure superheated 186 F. (total temperature 570 degs. F.) and will exhaust into a condenser maintaining a vacuum of 27 $\frac{3}{4}$ in at the turbine exhaust flange.

Steam will be bled from one stage of the turbine to a tubular type feed-water heater.

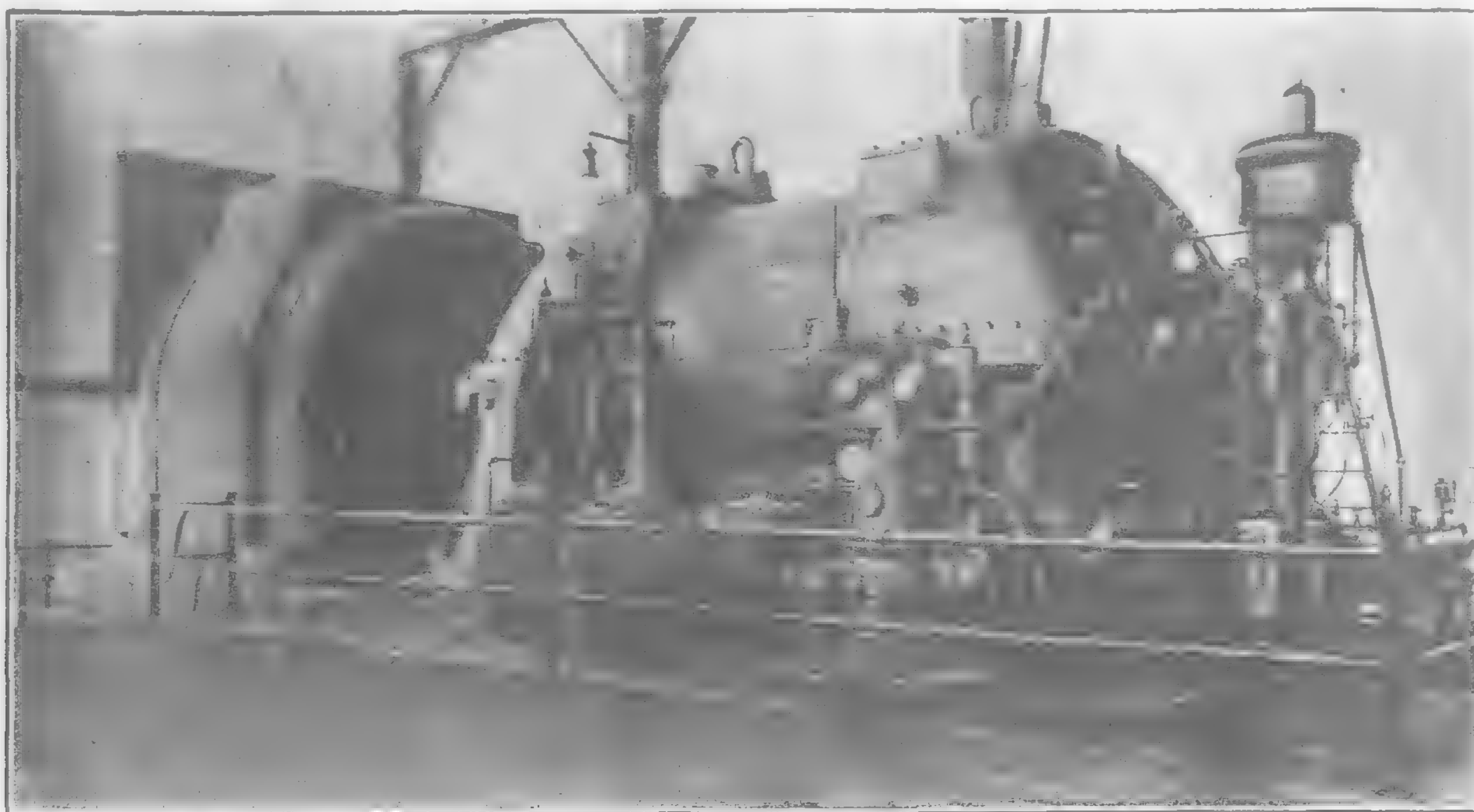
The alternator will be rated at 12,500 K.V.A. 80 per cent. P. F. 3 phase 50 cycles 6,600 volt and will be of the totally enclosed type and will be provided with a B.T.H. self-contained air cooler equipment.

During winter conditions the turbine will be capable of an output of 12,000 kw. and the alternator of 15,000 K.V.A.

The sub-contractor to the B. T. H. Co. for the condenser which is to have a cooling surface of 18,000 sq. feet is the Mirrlees-Watson Co. of Glasgow.

The cooling water is taken care of by a separate vertical spindle pump driven by a B.T.H. 320 H.P. vertical type induction motor.

This set will be the fourth B.T.H. unit in the North Point Station and the twelfth in the Hongkong area.



25,000 kw. Westinghouse Steam Turbine for the Senju Station of the Tokyo Electric Light Company

The Development of Manchuria

(Continued from page 504)

at Kanchingtzu, where new coal storage and loading wharves are being built to handle the enormous export and bunker trade from the Fushun mines, whose annual output is now over 9,000,000 tons. The new coal wharves are to be eight and a half kilometers in length, with a coal storage depôt having a capacity of 400,000 tons. The first stage of the construction program is expected to be completed by May, 1930, when steamers can bunker alongside the wharves in much more rapid time and more economically than is now possible at Dairen, where all available storage space will be needed for the heavy annual increase in bean shipments.

Commenting on the new estimates and construction program, Vice-President Matsuoka says that they are singularly free from any motive to increase the earning capacity of any one enterprise at the expense of another. The reason for the increase in the budget this year is due largely to the construction of the Kanchingtzu coal pier and double-tracking the rest of the main line. Expenses have been cut down to a minimum for all unproductive items, so as to allow sufficient funds for productive enterprises.

The new estimates are indicative of the S. M. R.'s new policy to cut adrift from its subsidiary enterprises and to make each self-supporting by rigid economy and improved supervision. For this purpose, the staff of each unit of these enterprises has been re-organized. The Anshan Iron & Steel Works which has hitherto been operated at a heavy annual loss, is expected under new management and methods, to bring in over a million yen profit the next fiscal year. Experts of the S. M. R. have been sent to Germany to conduct the investigations leading up to the founding of a nitrogen manure industry. Steel manufacture at Anshan and the manufacture of paraffine at Fushun are now under study and a draft plan for the establishment of a Guarantee Trust Company with Y. 100,000,000 capital, chiefly for the benefit of the Chinese is before the Finance Minister at Tokyo awaiting his approval. The new trust company expects to commence business next month.

The erection of plant for the distillation of oil from shale at Fushun is progressing. The reinforced concrete frame of the new furnace and its foundation has been completed and the cylinder is now in course of construction. The plant is expected to be completed by July, 1929. A company with a capital of Y. 5,000,000 fully

paid up, is to be organized for the manufacture of soda-ash, in which all the shares will be subscribed for by the S. M. R. but open to the public for participation. The soda-ash demand in Japan is 120,000 tons, of which only 20,000 tons are produced in the country. The Leased Territory is ideally situated for the manufacture of this basic product, being provided with an ample salt supply, fuel and water. A plant having an annual capacity of 50,000 tons is to be erected by the new enterprise.

The Anshan Iron & Steel Works having a present capacity of 300,000 tons of pig iron, is to be enlarged by the addition of another blast furnace that will increase its output to 400,000 tons. The plans contemplate the exporting of 160,000 tons of pig to Japan and to roll the balance of 240,000 tons into steel bars and sheets. In carrying out this new development, considerable opposition arose from the Japanese steel manufacturers, but an understanding having been reached, the new steel making enterprise will be at once started.

In order to carry out its fundamental policy of adhering to the Open Door, the S. M. R. has announced its intention to throw open its subsidiary enterprises to foreign investors on a fifty-fifty basis and guarantee the shareholders an annual return on their capital of eight per cent. and the necessary protection to lives and properties.

The immediate plans call for the organization into separate companies of the Iron & Steel Works, the Soda-Ash enterprise, the Ceramic Works and later on, even the profitable Fushun Collieries with their valuable subsidiaries will be detached. In addition, there are various forestry, mining, stock-raising and agricultural enterprises suitable for Sino-Japanese joint enterprise in which the Chinese will be encouraged to participate through the new investment and trust company.

In other words, the S. M. R. is prepared to sell a half interest to foreign investors in every going subsidiary of the company and guarantee the security that is now lacking in other parts of China. It is a fitting answer to the campaign that has been waged against the use of American money in Manchurian enterprises in co-operation with Japan. It indicates that Japan is determined to protect at all hazards the vast enterprises created by her initiative and capital in that territory.

The Manila Railroad Company and its Motive Power*

By E. W. Ladd

Prepared with the assistance of F. R. Ycasiano, Assistant Mechanical Superintendent of the Manila Railroad Company

THE franchise for a railroad line from Manila, the capital city of the Philippines, to Dagupan, a provincial center on Lingayen Gulf, was granted by the Spanish Crown to a British syndicate, as publicly proclaimed in the Official Gazettes of Madrid and Manila on July 17, 1886, and March 24, 1887, respectively. On July 8, 1887, Carlos E. de Bertodano, C.E., representing "The Manila Railroad Co., Ltd." of London, arrived in Manila for the purpose of inaugurating active construction work on the project. After two years of service, ill health prevented his further stay in the Islands, and on September 3, 1889, Inspecting Engineer Horace L. Higgins became his successor. Mr. Higgins afterwards became President and General Manager and continued to direct the road until January 8, 1917, when ownership was acquired by the Philippine Government. His energy, vision and executive ability during this long period so stamped his personality on the affairs of the railroad that the mere mention of the Manila Railroad Company suggests his name to many people, even outside of the organization.

The originally projected line from Manila to Dagupan, a distance of 195 kilometers, was completed and placed in operation on November 24, 1892, having taken approximately five and one-half years to build. It may be of interest to record a notation in the company's files to the effect that the native labor of the Philippines was found to be much more efficient and economical than imported Chinese labor. The estimated cost of the project was pesos 4,964,400 (\$2,482,200), as against an actual cost of pesos 7,900,000, or slightly over pesos 40,000 per kilometer. During the period of construction, and for ten years thereafter, all material and supplies used by the railroad

were declared exempt from the payment of customs duties and as an additional aid the Spanish Government guaranteed 8 per cent. interest on the investment for two years. This first section from Manila to Dagupan formed the nucleus of the present system of the Manila Railroad Company, comprising 1,047 kilometers of single track line and 13½ kilometers of double track line having a gauge of three feet six inches, with main line track laid with 65-pound

rail. This is the only steam railroad on the Island of Luzon operated as a common carrier, and therefore occupies a very important position in the social and industrial life of the Island.

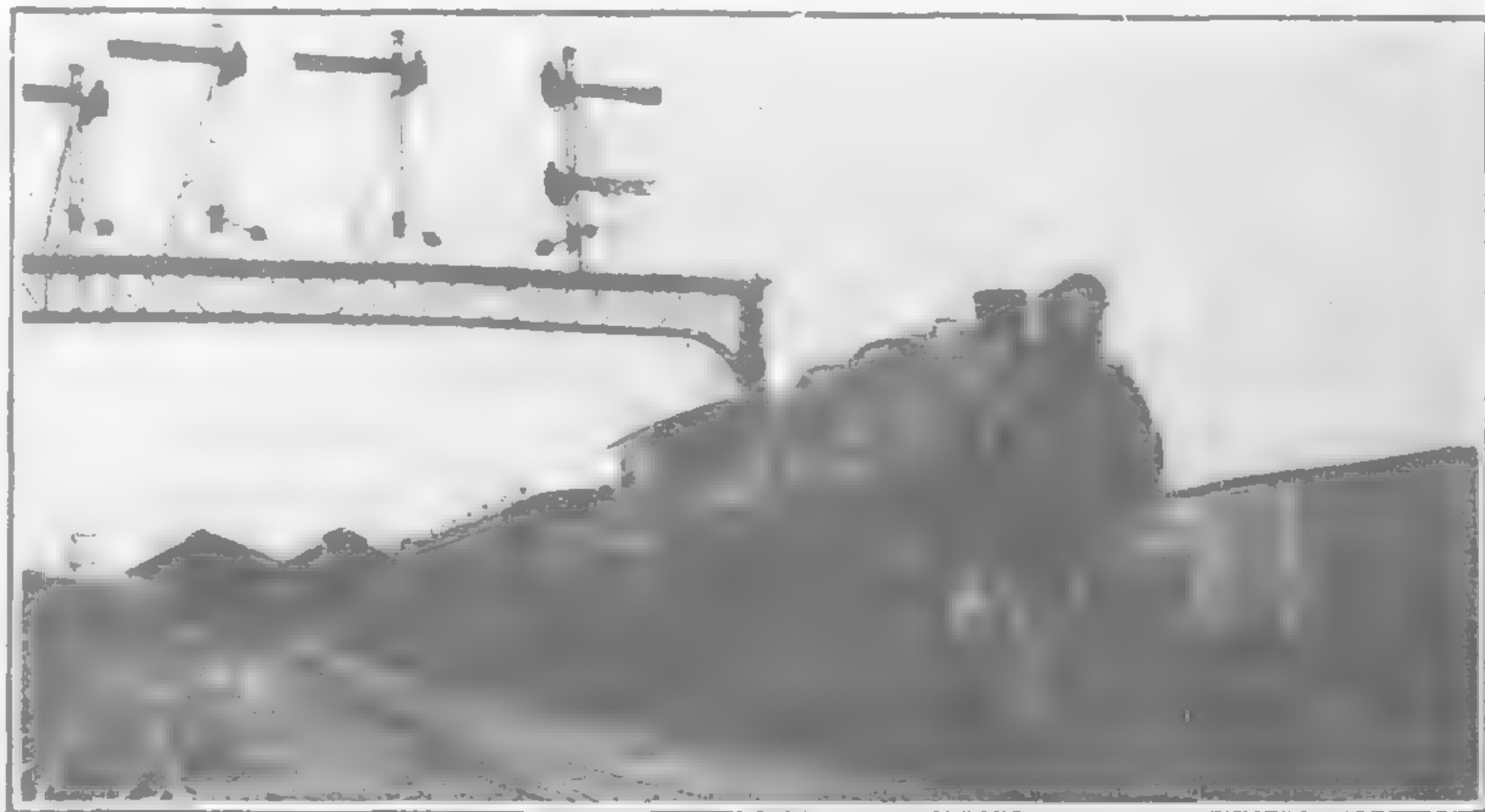
Beginning with 1893 the road entered upon a period of uneventful operation which lasted for five years. In May, 1898, just subsequent to the destruction of the Spanish fleet in Manila Bay by Admiral Dewey, the Filipino revolutionists tore up the road at various points, necessarily interfering somewhat with normal operation, and a claim was made by the railroad company against the Spanish Government for the damage done to the road and its equipment during this insurrection. Relief was, however, denied by the Spanish Government on the ground that the successful operation of the road would render material aid to the insurgents. Immediately after the American occupation of Manila on August 13, 1898, the roadbed was restored and traffic successfully resumed, only to be interrupted again early in February of 1899 by

the out-break of the insurrection against the American forces. The military authorities of the United States took control of the road and operated all of that portion falling within the American lines and the portions which fell into their hands as the American lines advanced.

* Baldwin Loco.



Locomotive of the 111-115 Class Built by American Locomotive Company in 1912



Baldwin Three-Cylinder Pacific Type Locomotive in Passenger Service at Manila



One of the Class F-7 Switching Locomotives in Service



Locomotive of the 1-15 Class Built by Neilson & Co., Ltd., in 1889



A Design of Six-coupled Switcher Built for the Seaboard Air Line by the Baldwin Locomotive Works in 1912



Locomotive of the 301-306 Class Built by Swiss Locomotive and Machine Works in 1914

This operation extended for approximately three years until the latter part of 1901, when the road was returned to its owners. The railroad management thereupon found itself confronted with the task of reconstructing destroyed bridges and roadbed involving a considerable outlay of money. Also a part of the rolling stock had been wrecked and station buildings burned along the entire line. Heavy indemnity claims were filed with the United States Government to cover the damages sustained as a result of the war. These were finally adjusted through granting of additional franchises and Government guarantees that helped to restore the company's financial equilibrium.

During the period from 1903 to 1904 an extensive construction program was actively undertaken and the company extended its lines both north and south of Manila. With the advent of the European war and other adverse conditions the company again found itself financially embarrassed, and after prolonged negotiations ownership of the property passed into the hands of the Philippine Government early in 1917, through the purchase of its entire capital stock.

Since the war comparatively little new construction has been accomplished the only important work, aside from the completion of projects initiated previously, being the construction of what is known as the San Pablo Cut-off, a line 22 kilometers long connecting the Pagsanjan Branch with San Pablo. This section was completed on August 20, 1923, and has made it possible to route main southern line traffic

over this connecting link having a maximum gradient of 1 per cent. compensated instead of over the old line around Mount Maquiling with adverse grades up to 2½ per cent.

The Island of Luzon is the largest of the Philippine group, being approximately 41,000 square miles in area, with plains and valleys of great fertility in the interior districts, shut off from the sea by mountain ranges and formerly with but crude transportation

facilities for their products. With the development of the highway system in the Philippines, so ably initiated and fostered by former Governor-General W. Cameron Forbes, agriculture was greatly stimulated and tonnage of agricultural products rapidly increased. The agricultural development of the past ten years, particularly to the north of Manila in the central plain of Luzon, has been especially noteworthy. The district adjacent to Cabanatuan in Nueva Ecija Province is now one vast rice field, and it is by no means improbable that before many years the Philippines will be exporting this important food staple instead of importing large quantities annually as in the past. Sugar cane growing has been tremendously stimulated by the establishment of modern centrals in several of the provinces within a radius of 125 kilometers from Manila, and both sugar and sugar cane are of first importance as traffic items of the railroad company, so much so as to tax severely the physical resources of the company during the peak of the milling season in the early months of the year. To the south of Manila in Laguna and



Map Showing the Present System of the Manila Railroad Company, Consisting of 1,047 Kilometers of Single Track Line and 13½ Kilometers of Double Track Line

Tayabas Provinces the railroad traverses the heart of what is probably the greatest single cocoanut district in the world. Literally millions of cocoanut palms bear their wealth-bringing fruit in this region and the development of the cocoanut industry, the commercial products of which are copra, cocoanut oil and dessicated cocoanut, has been one of the trade features of recent years. These three staples, rice, sugar (with the cane) and cocoanut products are the most important domestic traffic items of railroad, supplemented by hemp, tobacco, lumber and minor products. It can readily be appreciated that an active and increasing movement of these staples means a large and increasing purchasing and consuming ability on the part of the inhabitants of the territory served, and this in turn means an increasing use of a great variety of imported articles, practically all of which are distributed from Manila as a center.

Passenger business is also a very important part of the railroad traffic yielding almost as much in revenues as the freight business. The Filipinos are fond of traveling and an average of 600,000 to 700,000 passengers a month are carried by the company's trains. One of the pet jokes of old residents in Manila was to the effect that the former president of the company, Mr. Horace L. Higgins, upon being urged to provide more cars for the Filipino passengers, retorted that it would do no good to furnish more cars as they would simply fill them anyway. The railroad, however, gave serious consideration to this question and the facilities now provided are ample to accommodate the traffic. Express trains, stopping only at the important stations, leave and arrive at Manila daily both on the northern and the southern lines, and passenger, express and freight business is handled efficiently and courteously by the employees of the company, who are almost without exception Filipinos.

Supplementing the rail lines the company also owns and operates three small coasting steamers, one for service on the Pacific side of Luzon and the other two as connecting links between the southern terminus of the main southern line at Aloneros, Tayabas Province, and the Port of Pasacao in Camarines Province. From

this point it is but a short distance (served by motor trucks) to Pamplona, the northern terminal of what is known as the Legaspi Division, which extends from Pamplona to Legaspi and Tabaco in Albay Province, a distance of 139 kilometers. Arrangements have recently been made, through a subscription for additional stock on the part of the Government, to provide funds for the construction

of a rail line from Aloneros to Pamplona, a distance of about 110 kilometers, which, when completed, will give continuous rail connection from Manila south to Legaspi and Tabaco, and thus form a unified railroad system on the Island of Luzon.

The tabulation together with the illustrations throughout this article, will give an idea of the company's motive-power, consisting at present of 152 locomotives of all types. Of these 56 are of American manufacture, six were made in Switzerland and 90 are of

English manufacture. Forty-six of the American engines have been acquired since 1919, whereas the English engines are mostly tank locomotives purchased prior to 1910.

Commenting specifically on some of the various types, it will be noted that the engines acquired prior to 1892 were the 1-15 and

16-30 types. These light tank engines are still giving good service for very light traffic and are fairly useful as yard switchers, although they naturally have been shopped many times and have had many parts renewed during the almost forty-year period they have been in use. Originally carrying copper fireboxes and staybolts and brass boiler tubes, these have been replaced in the majority of cases by steel boxes and tubes and iron staybolts. The "San Fernando," "Cavite" and "Cabanatuan" types are also still useful for switching service, although the introduction of heavier

types of rolling stock is taxing their capacity on many occasions. The design of the six Swiss tank locomotives, type 0-8-0, is more suitable for this service. To economize fuel the grate surface can be partly blanked when these locomotives are used as switchers.

In the year 1906 eight ten-wheeled engines (Nos. 37-44) were purchased. These engines are provided with Walschaerts valve



Locomotive of the "Cavite" Class Built by Kerr, Stuart & Co., Ltd., in 1907



One of the Two Locomotives of the "Cabanatuan" Class Built by Kerr, Stuart & Co., Ltd., in 1907



Locomotive of the 16-30 Class Built by Dubs & Co., Ltd., in 1890



Typical Scene Along the Lines of the Manila Railroad Company



Mountain Type Locomotive of the 171-180 Class Built by American Locomotive Company in 1921

motion, have high tractive power in comparison with others previously acquired, and are quite a different type from those that the manufacturers, Kerr, Stuart & Company, Ltd., had previously built. The drivers are somewhat small and they are consequently slow in operation, in addition to which the reciprocating parts are proportionally much too heavy for the size of the engine, causing excessive wear and tear on the bushes and pins. The 25 engines numbered 71 to 95 purchased from the North British Locomotive Company, Ltd., in 1908, were very similar to the 16-30 type and at that time represented a standard which had proved to be suitable for the special requirements of the company. Of these twenty-five engines, five numbered 91-95, have Walschaerts valve motion and balanced D-valves, and twenty have Stephenson valve gear. Previously, in 1906, five tender locomotives with 4-4-2 wheel arrangement and of greater tractive power than the 16-30 type had been purchased from the same company, the North British, and in 1909 five tank locomotives with an additional pair of drivers, making the wheel arrangement 4-6-2, were acquired. With two exceptions these were the last tank locomotives purchased. The exceptions were the six engines purchased in 1914 from the Swiss Locomotive and Machine Works, Nos. 301-306, and the three engines numbered 126-128 acquired in 1917 from the North British Locomotive Company, Ltd. The Swiss locomotives were intended to be used with racks on a steep grade, on a proposed line running to Baguio, having a rise of about 4,800 feet in a distance of some 50 kilometers. This line was never completed and consequently the engines are now operated with the racks removed. They are powerful, but slow and hard to keep in repair.

In 1912 two lots of engines of five each were purchased from the American Locomotive Company, built according to British specifications, and bearing the numbers 111-115 and 131-135. These are tender locomotives of medium tractive power and were the first locomotives put in service that had piston valves with Walschaerts valve gear and superheater units. These engines were made, like all others purchased up to that year, with copper fireboxes but, unlike the other locomotives were provided with shaking grates, superheaters, damper regulators and front-end doors of purely American design. These appliances were, however, removed after a few months of service and British standards substituted, but during the last few years parts of American design were again applied, the copper fireboxes were replaced by steel and the ash pans provided with hoppers. Since these changes were made the engines have given very excellent service. The twenty ten-wheeled engines bought in 1919 and 1921 from the H. K. Porter Company are used for both passenger and freight

service on the lines north of Manila, and are very useful on account of their light weight combined with fairly good pulling ability.

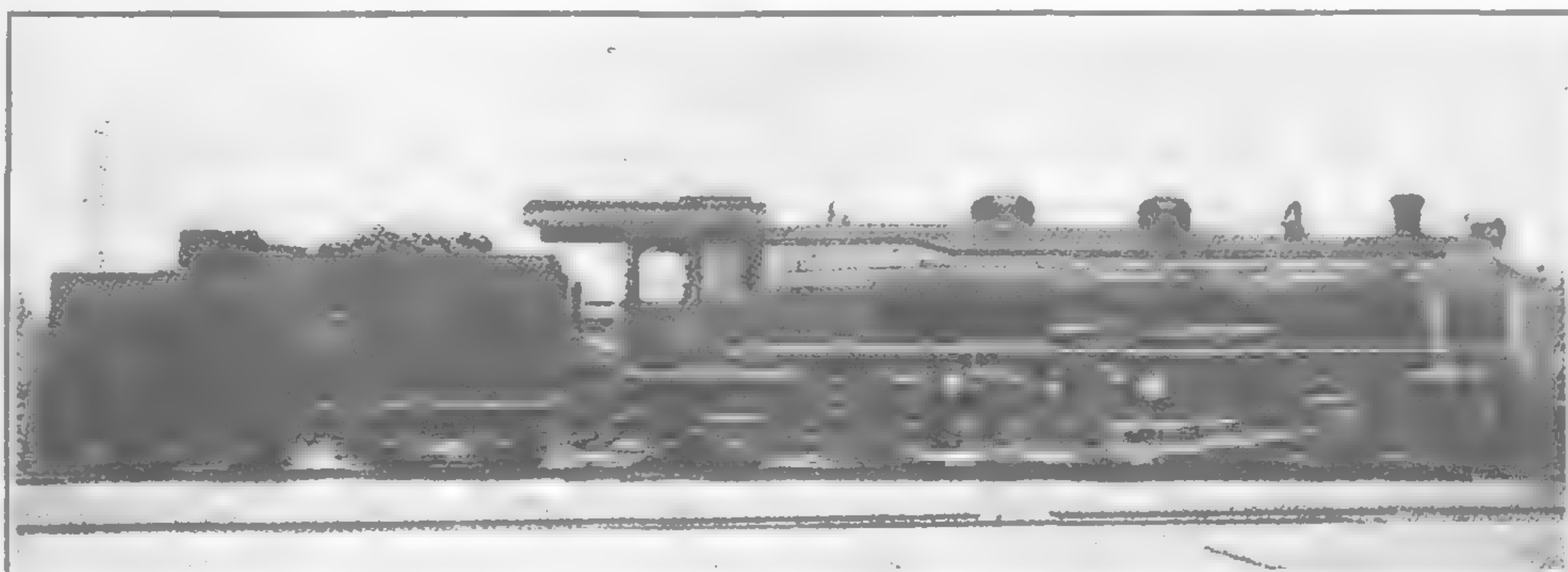
The pride of the road are the ten "Mountain" and ten "Santa Fe" engines purchased from the American Locomotive Company in 1921 and the six three-cylinder Baldwin "Pacifics" recently purchased. The ten "Mountain" and ten "Santa Fe" type locomotives were designed to handle respectively fast passenger and heavy freight traffic over the heavy grades on the southern lines, especially on the Maquiling hill section previously referred to. With the completion of the San Pablo Cut-off their high power is not absolutely required, but in time it is expected that the needs of the traffic will grow up to them. Notwithstanding their weight they are easy on track and are very economical from the standpoint of repairs and fuel consumption. These engines, however, are too heavy for the maximum permitted loadings on the bridges of the northern lines and accordingly have had to be used exclusively on the southern lines, where the traffic demands are less severe. In specifying additional motive power for the northern lines it was decided that three-cylinder Pacific type locomotives would answer the requirements for greater tractive effort than the 4-6-0 type Porter locomotives, without excessive axle loads. The six Pacifics built by The Baldwin Locomotive Works in 1927 and now in service, have more than met expectations, and are now handling the important passenger traffic on the northern lines. It should be mentioned, however, that work is now in progress looking to the strengthening of all bridges on the northern lines so as to safely carry any of the locomotives on the line, so that in future the company will not be handicapped by having motive power available for use but unsuitable on account of excessive weight.

The ten "Mountain," ten "Santa Fe" and six "Pacific" type locomotives all have superheaters, brick arches and

Worthington feed water heaters and the twenty Porters have superheaters and brick arches. Of the older engines, the 126-128 type purchased in 1917, and the 301-306 type purchased in 1914, as well as the ten engines acquired from the American Locomotive Company in 1912, also have superheaters. All locomotives on the line are equipped with electric headlights, the application of which was started in October, 1919, and all engines have the vacuum brake system and screw couplings in order to conform to the installation used by the British company.

As a result of the success of the six Baldwin three-cylinder Pacifics the company, in March of the present year, placed an order with The Baldwin Locomotive Works for eight three-cylinder Mikado type locomotives to be used in freight service. The order

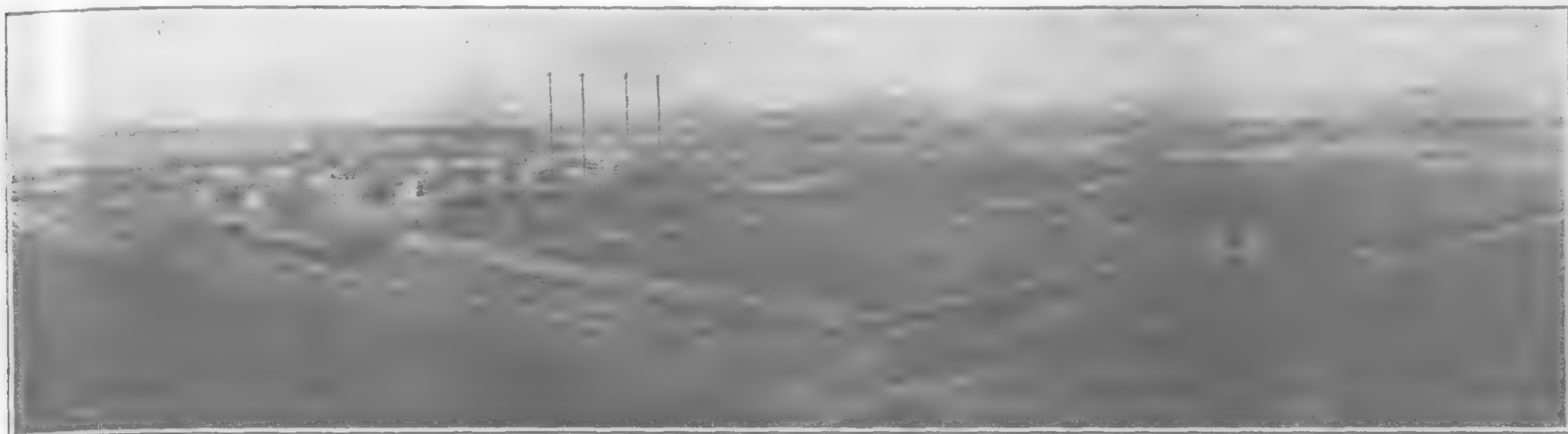
(Continued on page 516).



Santa Fe Type Locomotive, Class 201-210, Built by American Locomotive Company in 1921



One of the Six Three-Cylinder Pacific Type Locomotives Built by the Baldwin Locomotive Works in 1927



Iwakuni Factory of the Teikoku Artificial Silk Company, Ltd.

Rayon in Japan*

It is only two or three years since the manufacture of artificial silk (or rayon) has made any appreciable development. The rayon was first manufactured in this country as far back as 20 years ago, but the lack of skill and the high cost of equipment prevented the industry from becoming a paying proposition.

The Japan Rayon and Celluloid Company of the Suzuki interests of Kobe failed to carry out its original plans regarding Rayon and was forced to make the celluloid industry its principal business. In 1913 the Suzuki interests established a rayon manufacturing factory at Yonezawa. It was followed by the organization of several other companies and the opening up of factories in this business during the great war. Technical skill and necessary equipment were still wanting in all these companies who also complained of the difficulty of keeping up the business.

Of these rayon companies, only five (two largest and three of smaller scale) have survived the hard days. They are doing a good business at present, but at the time of their starting business, they all suffered similar hardships. One of the largest, Teikoku Jinzo Kenshi Kaisha (The Empire Artificial Silk Company) which succeeded in 1918 the one at Yonezawa and changed its name carried on its business, with a capital of Y.1,000,000, on viscose method.

In 1920 the company built a new factory at Hiroshima, and when the business appeared fairly promising, the capital was increased to Y.4,000,000 in 1925 and a large factory was built at Iwakuni, Yamaguchi Prefecture. The capital was again increased to Y.12,000,000 in 1926.

When this new factory was completed, the company expected to have a total daily productive capacity of 40,000-lbs. But the panic of April, 1927, that placed the Suzukis in an embarrassing position, affected the company which was forced to carry out a thorough readjustment. The company increased its capital from Y.12,500,000 to Y.21,000,000 in order to pay its debts to the Suzukis and arranged to redeem its public and other loans with business profit on a long term plan.

The Asahi Kinn-Ori Kaisha, the other of the two largest, was established by the Japan Raw Cotton Company interests in 1922 by amalgamating the Ashai Jinzo

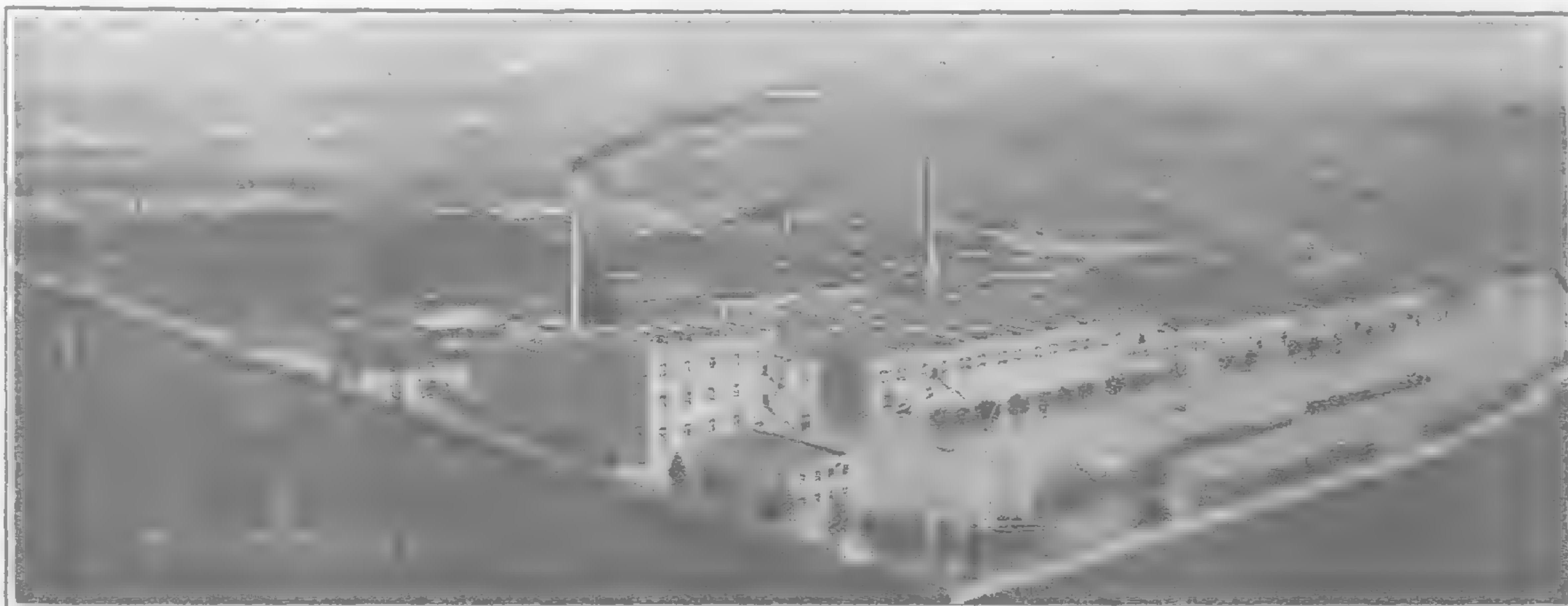
Kenshi and the Fuji Jinzo Kenshi Companies with capital of Y.2,000,000. The company obtained the right of monopoly of 20 different viscose methods from Vereinigte Glanzstoff Fabriken of Germany and built a factory at Zeze, on the shores of Lake Biwa, and started work in 1924.

As the product found a ready market, the company increased its capital to Y.4,000,000, and in 1925 produced rayon of large count of 90 denier for the first time in this country. The company further increased in June, 1926, its capital to Y.8,000,000 in order to build a large-scale factory at Nobeoka, Kyushu.

In the second half of 1926, however, the rayon market everywhere suffered a blow and whereas it was quoted at as much as Y.400 per 100-lbs. it dropped to Y.240, reducing the company's profit for the period (the second half, 1926) to nearly one-half of that of the preceding term. The construction work on the new factory at Nobeoka was therefore stopped to await the improvement of the market. It is proposed that a new factory will be built on a three-period plan, with a total daily productive capacity of 36,000 lbs.

A comparison of the business result of these two companies is as follows: (Unit Y.1,000).

TEIKOKU JINZO KENSHI						
1926			Paid up capital	Profit	Dividend	
First half	...	...	Y.5,000	Y.1,023	20%	
Second half	...	...	8,750	871	17%	
1927						
First half	...	...	8,750	757	—	
ASAHI KINU-ORI						
1926						
First half	...	...	Y.3,500	905	15%	
Second half	...	...	5,333	562	15%	
1927						
First half	...	...	6,000	670	15%	



Uji Factory of the Japan Rayon Company, Ltd.

New Factories Appear

The large profit thus realized by the rayon companies encouraged many new rayon factories to appear, principal among those the following may be mentioned:

* "Osaka Mainichi."

NIHON RAYON COMPANY

Established March, 1926, by the Dai Nihon Cotton Spinning Company interests. Capital, Y.15,000,000. Factories: Uji, near Lake Biwa. The viscose method used. Some of the factories started work in the first half of 1927.

TOYO RAYON COMPANY

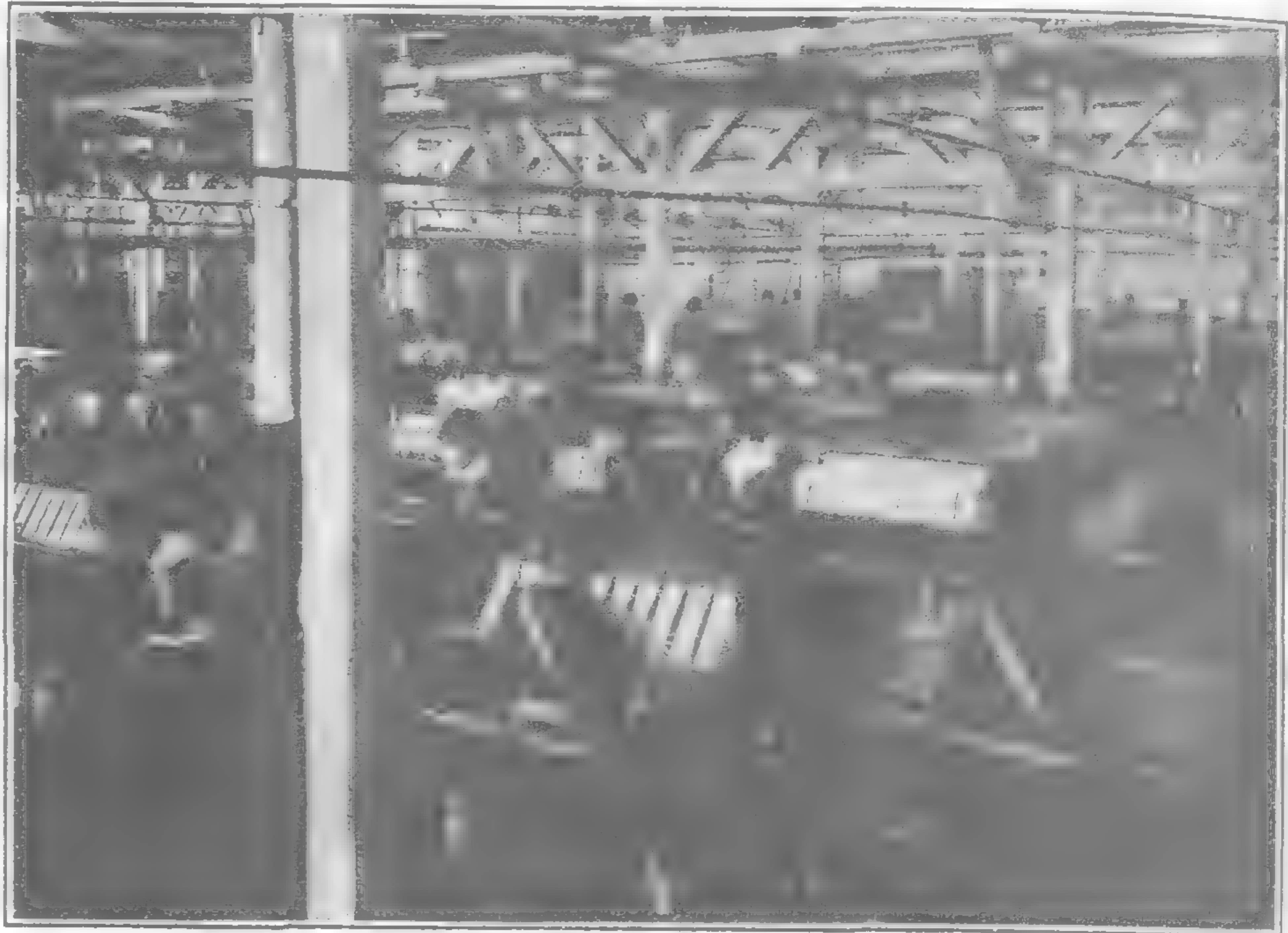
Established February, 1926, by the Mitsui interests. Capital, Y.10,000,000. Factories, Ishiyama, near Lake Biwa. Daily output, 6,000-lbs. The viscose method used.

KURASHIKI KINU-ORI KAISHA

Established June, 1926, by the Kurashiki Cotton Spinning Company interests. Capital, Y.10,000,000. Factories, Kurashiki, Okayama Prefecture. Daily output, 3,300-lbs. The viscose method used.

The Toyo Cotton Spinning Company is planning to build a rayon plant with a daily productive capacity of 2,200-lbs. at Katada, on the shores of Lake Biwa. The Nihon Woollen Cloth Company is planning to install the viscose method in its Nagoya factories with a daily productive capacity of 12,000-lbs., with the particular intention of weaving a mixture of rayon with its own woollen cloths. There are many other companies who are also planning to open rayon factories as a side business.

In 1926 Teikoku Jinzo Kenshi produced 3,200,000-lbs., Asahi Kinu-Ori 1,950,000-lbs. and other factories, 450,000-lbs., or a total of 5,600,000-lbs. which compared with the total output of 3,200,000-lbs. in 1925, shows an increase by 2,400,000-lbs. The total output for 1927 is expected to reach 10,000,000-lbs. and when all the rayon factories now building start operation, the output is expected to check imports of foreign rayon.



Re-reeling Room in An Artificial Silk Mill

The recent figures of rayon imported to this country are as follows: (Unit, lb.)

1923	...	...	1,020,240	1924	...	...	900,563
1925	...	...	716,611	1926	...	...	3,302,537

The reason that the import of rayon showed an increase in 1926 was due to over-imports on account of revision of the customs tariff in April, 1926. The imports for 1927 are expected to show a marked decrease.

The Manila Railroad Company and its Motive Power

(Continued from page 514).

stipulates that delivery is to be made in two lots of four locomotives each, so that the first four can be tried out in service before the second lot is built. This will give the company the opportunity of specifying any minor alterations which may be found desirable on the last four locomotives.

These Mikado type locomotives will be slightly heavier than the Pacifics, but they will develop about 27 per cent. more tractive force, due to the fact that a greater proportion of the total engine weight is carried on the driving wheels. These locomotives will have cylinders 15 inches by 22 inches, driving wheels 48 inches diameter, working steam pressure 200 pounds per square inch, weight on drivers 102,000 pounds, total engine weight 143,000 pounds and they will develop a tractive force of 26,350 pounds. As originally built

they will be equipped to use soft coal as fuel, but will be arranged so that they can readily be converted to oil burners if desired.

The somewhat heterogeneous nature of this array of engines and the number of small-powered, not to say obsolete, machines still in use leaves a great deal to be desired from the standpoint of standardized equipment and operating efficiency. However, it must be remembered that the company operates a railroad of less than standard gauge in a tropical oriental country, running many light passenger and mixed trains, with quite a number of short branch lines. At the same time the deficiency in the equipment is fully realized and an effort is being made to modernize the motive power as rapidly as may be justified by financial and operating conditions.

TABULATION SHOWING THE PRINCIPAL CHARACTERISTICS OF THE VARIOUS CLASSES OF MOTIVE POWER OWNED BY THE MANILA RAILROAD COMPANY

Year Acquired	Type	Number of Locos	Name or Road Number	Tractive Power Pound	Diameter of Driving Wheels	Dimensions of Cylinders	Weight Total Engine Metric Tons	Makers
1889	2-4-2	15	1-15	7,605	4-ft. 6-in.	13-in. by 18-in.	31.6	Neilson & Company, Ltd.
1890	0-6-2	15	16-30	10,530	3-ft. 3-in.	13-in. by 18-in.	29.0	Dubs & Company, Ltd.
1906	4-6-0	8	37-44	18,770	3-ft. 4½-in.	16-in. by 22-in.	40.6	Kerr, Stuart & Company, Ltd.
1906	4-4-2	5	101-105	13,824	5-ft. 0-in.	16-in. by 24-in.	41.5	North British Locomotive Co., Ltd.
1907	0-6-0	4	S. Fernando	4,810	2-ft. 4½-in.	9-in. by 14-in.	15.0	Kerr, Stuart and Company, Ltd.
1907	0-6-0	8	Cavite	6,415	2-ft. 9-in.	10½-in. by 16-in.	21.3	" " "
1907	0-6-0	2	Cabanatuan	8,749	3-ft. 3½-in.	12-in. by 20-in.	25.4	" " "
1908	0-6-0	25	71-95	10,140	3-ft. 4½-in.	13-in. by 18-in.	35.3	North British Locomotive Co., Ltd.
1909	4-6-2	5	121-125	17,280	4-ft. 0-in.	16-in. by 24-in.	58.0	" " "
1912	4-6-0	5	111-115	15,606	5-ft. 0-in.	17-in. by 24-in.	55.125	American Locomotive Company
1912	2-8-0	5	131-135	19,507	4-ft. 0-in.	17-in. by 24-in.	56.135	" " "
1914	0-8-0	6	301-306	26,477	3-ft. 0½-in.	17½-in. by 17½-in.	49.10	Swiss Locomotive and Machine Works
1917	4-6-4	3	126-128	17,340	4-ft. 0-in.	17-in. by 24-in.	76.83	North British Locomotive Co., Ltd.
1919	4-6-0	10	45-54	15,840	4-ft. 0-in.	16-in. by 22-in.	41.74	H.K. Porter Company
1921	4-6-0	10	55-64	15,840	4-ft. 0-in.	16-in. by 22-in.	41.74	" " "
1921	4-8-2	10	171-180	28,600	5-ft. 0-in.	20-in. by 28-in.	83.18	American Locomotive Company
1921	2-10-2	10	201-210	35,700	4-ft. 0-in.	20-in. by 28-in.	85.45	" " "
1927	4-6-2	6	141-146	20,700	4-ft. 6-in.	15-in. by 20-in.	60.0	The Baldwin Locomotive Works

Philippine Lumber for the Philippines

Foreign Control of the Timber Field Starts Move Which Goes Deep Into the Heart of Philippine Problems

By H. F. Wilkins

THE Philippine Government retains title to all forest land of the Islands and adheres to the policy of leasing tracts for lumbering purposes to responsible corporations who glean the forest and jungle products and ship them to foreign markets. Exports of sawed lumber have increased 1,000 per cent. in the last nine years, but still the enormous resources of the Philippine forests remain practically dormant.

The Islands possess more than 64,000 square miles of commercial forests. Officials estimate the available standing timber ready for the saw at 200,000,000,000 board feet. Many of the woods have excellent figure and finishing qualities and are in demand for cabinet and interior work in the United States and Europe as well as Oriental countries.

Exports of sawed lumber in 1927 totaled 72,034,632 board feet, of which nearly 19,000,000 were sent to Japan. Shipments to Japan increased 63 per cent. last year, and are expected to increase to proportionately greater figures when the export returns for 1928 are available.

On the other hand, exports to the United States, by far the largest importer of Philippine lumber products, took a serious drop in the first half of the year 1928 that is worrying lumber producers and foresters both in the Philippines and in the States. According to the lumber division of the Department of Commerce in Washington, D. C., soft wood imports from the Philippines were \$5,000,000 lower, while hardwood imports, excepting cabinet lumber, were \$550,600 lower. Among the few items which found continued demand in the United States market, or showed slight increase, were the Philippine hardwoods made up into cabinet lumber. This item is increasing in demand in the United States and bids fair to continue as an important item of U.S. import from the Islands, the bureau says.

While the foregoing gives some idea of the magnitude of the lumber industry in the Philippines and the trend of export, it fails

to reveal a situation of increasing tensivity in the industry which delves deep into problems of immigration and foreign commercial control. Far-sighted lumbermen and forest experts see in this industry possibilities of a political and international issue which may be of considerable significance in the next few years to come.

Frankly, Filipino politicians, watchful of Philippine resources, are worried over the wedge that Japan and China have inserted in this basic industry. It is commonly known and accepted that Chinese interests have for years maintained absolute control over the retail lumber market in Manila. A lumberman of many years' experience in the Philippines states unequivocally that Chinese capital controls well over 95 per cent. of this retail trade in the city.

This is neither the time nor place to take sides in such an issue. Best to state the available facts and let those interested draw their own conclusions. Some are of the opinion that it is well to "let sleeping dogs lie," but since the Filipinos themselves have already stirred up a public fuss in the legislature over the matter, an airing of the situation may prevent future misconception.

Two bills have been introduced in the Philippine Legislature this year bearing directly on the problem. One of them, introduced by Senator Jose O. Vera and known as the Vera Bill, provided in its original form, limitation to 5,000 hectares the amount of land subject to lease for purposes of extracting timber. Also in its original form, the bill allowed the area to be increased to 10,000 hectares "for special purposes." The Bureau of Forestry was to decide whether the purposes were "special" enough to grant the 10,000 hectare lease.

But the bill was amended before passing the Senate. The amendment read: "forest products shall be cut, gathered or removed in or from any forest only upon license of the Bureau of Forestry: Provided, however, that when the area of the land covered by an



Loading At Rail Centers.—Where Railway Facilities are Available, The Lumbering Business in the Philippines is Vastly Simplified.

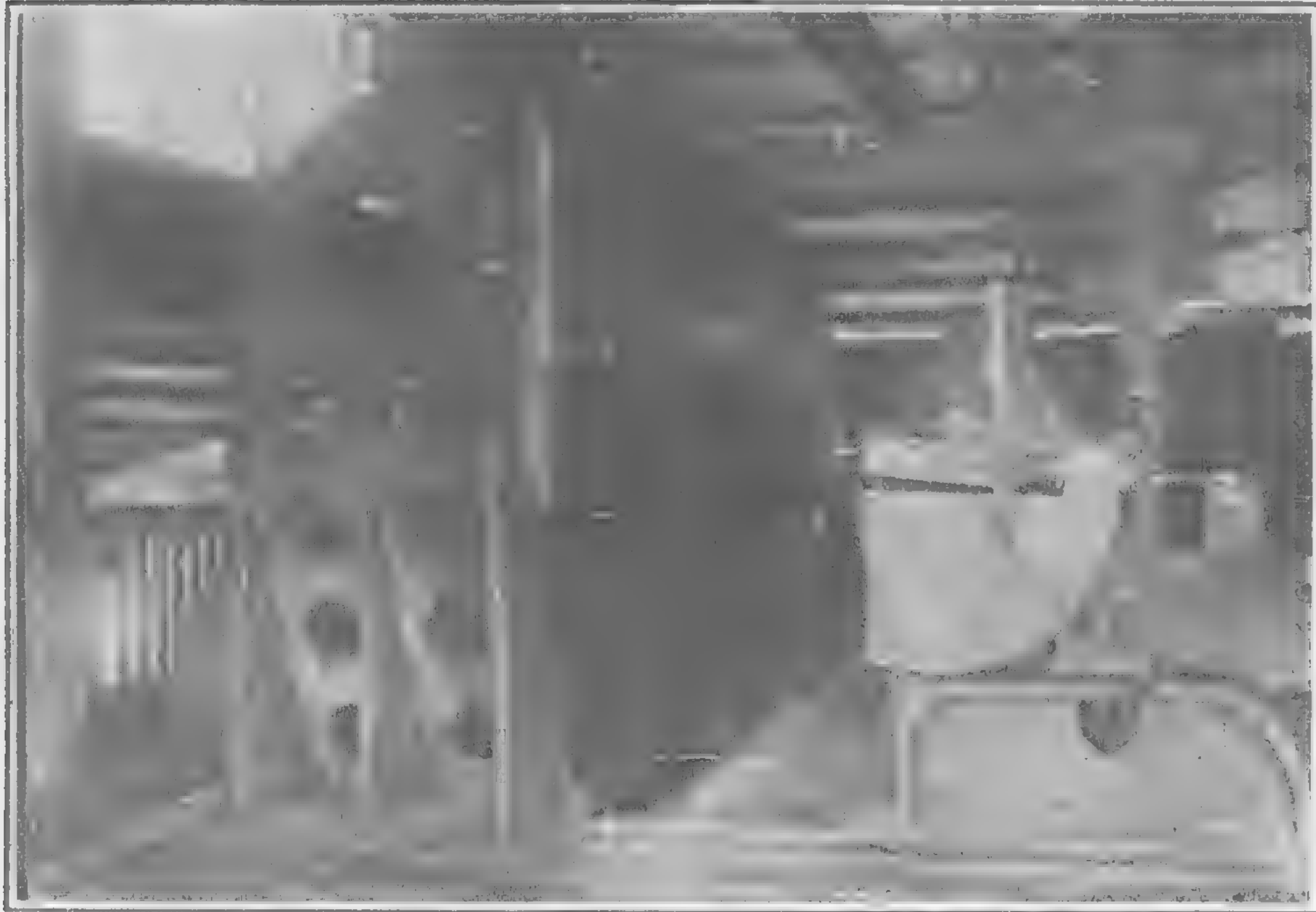


As They Do In China.—The Old-Fashioned Chinese Manner of Sawing Lumber Has its Vogue in the Philippines, But With the Advent of Modern Machinery in Recent Years, This Primitive Man-Labor is Going Out of Style.

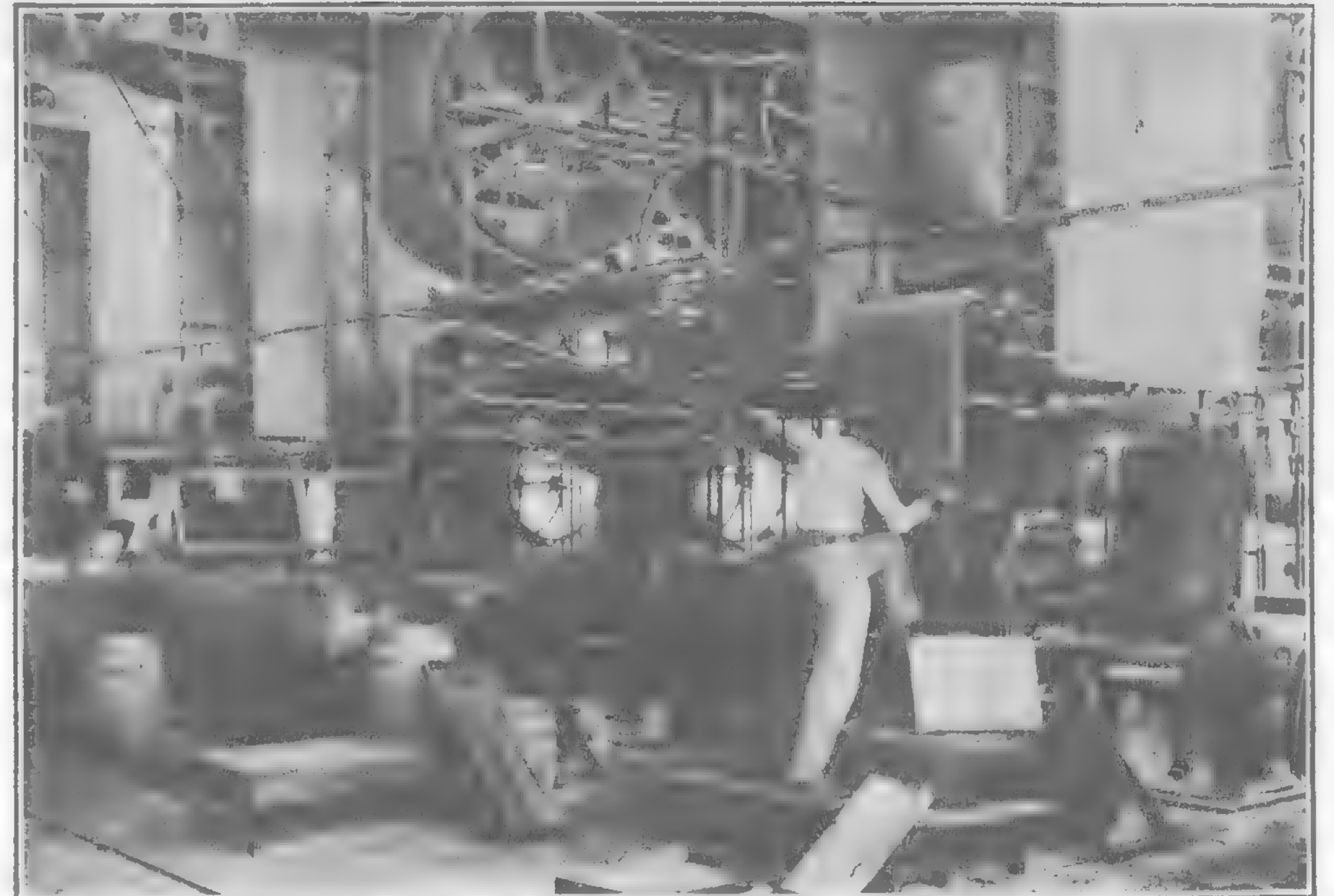


Modern Lumber Mill in the Philippine Provinces.—One of the Insular Lumber Company's mills at Fabrica, Occidental Negros. This is the oldest company and also the largest in operation in the Islands, producing 100,000 board feet of cut lumber daily.

MODERN LUMBER MILLS IN THE PHILIPPINES



Making Veneer at the Source of Supply.—Some of the More Progressive Lumber Companies Have Mills and Factories in the Provinces, Shipping Finished Products Right from the Source of Timber Supply. This Veneer Slicing Machine is located at Limay, Bataan, Operated by the Cadwallader Gibson Lumber Company.



A Modern Match Factory in Manila.—Another Local Market Has Been Developed With the Establishment of a Modern Match Factory in Manila, Photo Shows Automatic Dipping Machine in Operation.



Some Philippine Timber Goes to Local Markets.—Interior of a Manila Furniture Factory, Part of the Cadwallader Gibson Company's Sawmills, at San Miguel, Manila.



Modern Provincial Veneer Plant.—General Interior View of the Cadwallader Gibson Company's Veneer Plant at Limay, Bataan, Showing Circular Veneer Carriages; Veneer Sheet in the Background.

ordinary license or by concession by contract for the cutting of timber exceeds 1,024 hectares, the license or concession shall not be issued except upon the prior approval of the Secretary of Agriculture and Natural Resources."

In this form it did pass the Senate. It was a great deal worse than the original, from the point of view of those holding land under lease and engaged in the lumber business. In the first place it cut down drastically the amount of land made available for operations, and in the second place it gave a powerful weapon in the form of a land grant veto to an official outside the Bureau of Forestry.

At the time of writing, the bill has not passed the House of Representatives. It is in committee, waiting for final hearing. It is understood from inside sources that the Filipinos themselves, those who have interests or friends in the lumber business, are strenuously opposing it. The discussion hinges around another proposed amendment to the bill which would make it apply only to new lumber companies entering the field, and not to the old ones. In this form, the bill meets with rather wide approval.

Another bill, known as the Quirino Bill, introduced in the Senate and now in the hands of a committee, flatly limits the industry to Filipinos and Americans by prohibiting leases being granted to foreigners. This bill is regarded as having less chance of passing the legislature than has the Vera Bill, but it indicates the trend of things.

The Bureau of Forestry, a capable and efficient organization under which the industry has developed so rapidly in the last 10 years, assumes a fairly definite stand on the matter. Having control of the leasing privilege, it is directly concerned. The director of the Bureau, Arthur F. Fischer, capable American forest expert with an intimate knowledge of Philippine problems, is committed to the policy of furthering Philippine and American interests over those of other countries.

"There is absolutely no reciprocity in foreign exploitation of Philippine timber," he points out. "What chance has an American or a Filipino to enter Japan or China for the purpose of cutting off timber under lease? Absolutely none. Naturally, so far as it lies within my power, I will favor American or Philippine exploitation of forest resources in the Islands."

The Bureau granted more than 8,000 licenses last year, and a fair proportion of these licenses were to Japanese and Chinese operators. According to Bureau of Forestry figures, Chinese-owned firms produce 23.9 per cent. of the total cut at the present time, and Japanese-owned companies, 1.6 per cent. The Japanese have been conducting extensive operations only in the last four or five years.

Here is an interesting table compiled by the forestry bureau showing exports for 1927, the amount sent to each country and its value in pesos:

Country of destination				Quantity (Board Feet)	Value (Pesos)
United States	...	...	...	39,351,016	3,446,757
Japan	...	...	...	18,994,775	1,033,721
Great Britain	...	...	...	4,834,024	392,159
China	...	...	...	4,518,568	326,423
Australia	...	...	...	3,785,048	324,047
Netherlands	...	...	...	184,440	16,750
Belgium	...	...	...	96,248	7,614
Italy	...	...	...	71,656	7,511
British Africa	...	...	...	60,208	2,703
Hongkong	...	...	...	43,672	9,399
Egypt	...	...	...	37,312	4,356
Canada	...	...	...	25,864	1,800
Spain	...	...	...	18,232	4,563
Germany	...	...	...	12,296	1,510
Guam	...	...	...	848	290
Hawaii	...	...	...	424	200
Total	...	...	...	72,034,632	5,580,003

The Philippines offer an attractive field for a lumberman of any nationality. They are particularly rich in the number of varieties of woods. There are 40,000 square miles of solid virgin forest and about 24,000 square miles of scattered or second-growth trees. Some 2,700 different varieties of woods are so far identified, whereas in the whole of North America there are but 600 kinds.

Requirements for concessions have in the past been little more than nominal. The chief thing is that the companies seeking licenses mean serious and legitimate business. They are required to put up a bond guaranteeing that the amount cut will not fall below a certain figure mutually agreed upon between the concessionaries and the Bureau of Forestry.

The lumber business of the Philippines has naturally a great effect on the economic development of the Islands. The business has increased imports considerably. The amount of machinery for lumbering and sawmill purposes, mostly from the United States, has been very great.

Previous to 1918, exports of lumber were not great. In that year the amount exported was 7,080,376 board feet, and since that time there has been a steady increase until last year it exceeded 72,000,000, as previously stated. This is an increase of 1,017 per cent. in nine years.

Trade Commissioner C. G. Howard, in his commerce report of April 9, 1928, says in regard to lumber exportations from the Philippines: "As usual, most of the export was red and white lauan. The year 1927 was favorable for the sawmills and several new small units were started while the larger operators without exception extended their activities. Total production is believed to have reached the record of 1,000,000 cubic meters or 424,000,000 board feet in 1927. Lumber companies are expecting a continuation of the good local market on account of the many construction projects contemplated.

The part played by the Bureau of Forestry of the Philippine Government is interesting, especially in view of the control the Bureau exercises over foreign concessions. Its chief constructive work lies in preservation of the natural forest resources through wise exploitation. It is the avowed policy of the Bureau to see that the forests are maintained as a permanent institution and paying the greatest possible dividends to the inhabitants of the country.

It is no small part of the work of the bureau to teach the general public the true and full value of forests. The problem is to impress on people that the forests are valuable not only because of the lumber, firewood, charcoal, nipa, dyes and gums and medicines, but because also of their great effect on the climate and productivity of agricultural lands. The forests are valuable of course for their by-products, but they also influence the climate and the rainfall. They prevent floods, erosion of the soil, desolation of the fertile lowlands. In the Philippines, with prevalent torrential rains, hundreds of square miles would soon be bare if it were not for the saving effects of the forest areas.

Luckily, fire is not a serious menace to Philippine forests, excepting for one practise indulged annually by Filipino settlers. They have a method of burning out clearings in the forests called "caingins," to augment temporary crops. This practise is a serious menace, for they cultivate in one place for a while, then move to another, with great destruction from erosion resulting. The bureau is now attempting to regulate such waste by spreading propaganda against the practise of burning off these clearings.

In Spanish times the users of lumber were extremely conservative. They restricted their selection to a few of the best known and tried timbers, leaving the rest as they found it. The Bureau of Forestry instructs builders and carpenters about woods that have the same qualifications, so that all woods will be utilized. It is found that some woods made almost equal in quality to the best grades by a process of creosoting, which has found wide use, especially in the preparation of railroad ties both for home use and for export. Many of these treated ties have found their way into Chinese railroads. The Atlantic Gulf and Pacific Company has an extensive plant devoted to increasing the durability of woods, and they are meeting with great success. The first grade woods are getting scarcer and therefore more expensive, so the creosote processing is proving a providential method of waste prevention, both in money and in standing timber valuable for seeding.

One of the most important Bureau functions is "land classification," that is, taking sections of the country as units and the Philippines as a whole and designating to what use the lands should be put so as to insure the greatest possible use to the inhabitants. The Bureau also recommends, surveys and allocates lands to be used as national parks and permanent forest reservations. There are at present eleven of these reservations and four national parks, ranging in area from 4,000 to 20,000 hectares.

It is estimated reliably that approximately 100,000 men are employed at present in the timber industry of the Philippines. Although the Bureau of Forestry may not have succeeded in establishing a "dignity of labor" in the Islands, at least they have gone a long way in this direction. The demand for men trained by the Bureau, both by local lumbermen and by governments outside of the Philippines is proof of this. What is called "stealing men" from the Bureau by the lumber companies goes steadily on, as the companies pay higher wages than the Bureau can afford to pay, and the companies get the benefit of trained men without the trouble of training them. This is a compliment to the quality of training administered by the Bureau which the Bureau would gladly pass up, for they need their men.

So much for the work of the Bureau of Forestry, which is an important factor in the development of the lumber industry in the Philippines. Consider the minor forest products. Philippine forests are rich in these. Firewood from the forests is accepted as a matter of course, yet few who use it realize what a calamity to the country it would be if the supply were depleted or even scarce.

Minor forest products, with the discoveries of modern chemists and the exploitation of efficiency doctrines in industry, have assumed a great importance in recent years in world progress. In the Philippine forests, the following so-called minor products are found in paying quantities: Rubber, quinine, camphor, alcohol, copal and other gums and resins; dyes, charcoal, fibers, rattan, nipa for thatching houses, tan barks, gogo (soap bark), diliman, paper pulp, beeswax, carbo negro for ropes, buri and other fine straws for hats, medicinal plants, balao, lumbang and other valuable oils for paints, turpentine, and tree ferns from which valuable curios are made. Not forgetting the abaca plant, which furnishes Manila hemp fibers, the finest in the world, a product which the Japanese in Davao, Mindanao, have exploited beyond the dreams of those who first saw its possibilities.

The number of Filipinos engaged in the lumber business in their own land is comparatively small. There are no large Filipino companies, and those that do exist are hampered by lack of capital and therefore bound down by the money lending system which is such a drawback to economic progress in the Philippines. Money lenders in the provincial districts of the Islands charge usurious rates and get the poor borrower coming and going. He is virtually an economic slave.

In general, the Filipino portion of the lumber industry lacks initiative. The condition of some of the small native companies has been somewhat improved by a policy of the Bureau of Forestry which allows them to sell their timber in logs for direct shipment to foreign markets. But some of the foreign companies have this same privilege, so the competition is just as great as before.

The shipping situation contributes to the difficulties experienced in the timber field by small companies and large alike. The offshore shipping is in a fairly satisfactory condition, but not so the inter-island trade. Years ago it was a problem for lumber companies to obtain bottoms to ship their products to the United States and foreign countries, but that has been simplified since Shipping Board vessels and other large capacity ocean going merchantmen load directly at Southern Island ports. Ports have been opened near some of the big mills, and handling equipment in most of them is strictly up-to-date.

But the inter-island shipping is a problem that all must contend with. It costs as much to ship 100,000 board feet of lumber from the Port of Zamboanga to the Port of Manila as it does to ship from Zamboanga all the way to the United States. Similar disparity is prevalent even between some of the Southern Island ports, within sailing distance of one another for small boats—Cebu and Iloilo, for instance. This is an enormous hindrance to the proper development of local markets for timber products and by-products.

Data on some of the various companies operating in the Islands gives an idea of the extent of the trade, and of the size of the units in operation. There are at the present time in the Philippines 13 so-called long-term licenses, popularly known as concessions. These concessions range in land area from 27 square miles to 448 square miles, and are located on the islands of Luzon, Mindanao and Negros.

Some of the leading saw mills;

The Insular Lumber Company of Fabrica, Occidental Negros, the oldest and also the largest in operation. It was established in 1904, and the daily cut is now about 100,000 board feet.

The Cadwallader-Gibson Lumber Company, established in 1908. They have a concession in Camarines Sur and the main base of operations at Limay, Bataan. The combined output is about 60,000 board feet per day.

The Port Lebak Lumber Company, of Port Libak, Zamboanga with a concession of about 165 square miles. Their output is about 30,000 board feet a day.

The Kolambugan Lumber and Development Company at Kolambugan, Lanao. This company cuts about 75,000 board feet a day.

The Filipinos Lumber Company at Kabibihan, Tayabas, with a daily cut of about 50,000 board feet.

The Basilan Lumber Company, Port Holland, Basilan, incorporated in 1914 although in operation several years before this time. This company turns out about 30,000 board feet a day.

The Negros Philippine Lumber Corporation of Cadiz, Occidental Negros, established in 1912 and producing now about 75,000 feet daily.

The Port Banga Lumber Company at Port Banga, Zamboanga, established in 1909, now producing about 30,000 feet a day from an excellent stand of timber.

All of these companies, long and solidly established, are specializing to greater or less extent in the manufacture and shipment of articles made from the forest products of the Philippines, in addition to the shipment of sawed lumber. Some of them are owned and operated by Chinese capital. The Dee C. Chuan Company is one of the largest establishments in the Philippine lumber business exclusively owned by Chinese. The older companies with greater resources naturally make the most profit.

The case is different with Japanese companies operating in the Philippines. Lumbering here in Japanese hands is still somewhat new and in the experimental stage. The vast increase in shipments to Japan last year show the possibilities of the Japan market for Philippine lumber.

But since they are in the experimental stage, most of them with less than ten years of experience in operation here, the Japanese companies are loth to sink capital in a venture which from their point of view is unproven. Therefore they are experiencing difficulties and despite their large shipments to the homeland, are not making large profits. One of the largest Japanese operators in Manila claims to be losing money. Others are about breaking even on the investment.

The largest of the Japanese firms operating in the Islands, and also the oldest in point of establishment in the Philippines, is the Philippine Export Lumber Exportation Company. This company's experiences are typical of what the newcomer encounters, and since they have gone into virtually unexplored territory with a different plan of exploit than has been tried before, their story is interesting.

The company operates on a strip of coastline in Northeast Luzon, where all is virgin jungle and where the only inhabitants are Negrito tribes who rarely if ever see outsiders. Operators there are doing the hardest kind of pioneering work. They take lumber from the more readily accessible forests on the edge of the coast and up some of the rivers that pour down from unexplored mountain fastnesses to the west. The kind of timber they get includes many of the choicest hardwoods found in the Islands. Most of it is so heavy that it will not float, and has to be loaded on bamboo rafts at the shore line and floated out to ships for loading into the holds.

This company maintains through a subsidiary Corporation in Japan, a fleet of vessels which call periodically on this barren coast line to pick up logs. These ships are also engaged in general merchant trade, but their main cargo on the return trip is lumber, and this company is largely responsible for the 63 per cent. increase in exports of Philippine lumber to Japan last year.

S. Nakamura, of Tokyo, president of the company, with K. Andoh, manager of the Kobe branch, visited the Philippines not long ago to view the situation. A newspaper story was published to the effect that the company is contemplating increasing the capitalization by P.1,000,000. This was later denied. Officials of the company state that they are undecided whether to continue under the present capitalization of P.500,000 or to increase this and put in plants for the manufacture of lumber products. A great deal depends on the action taken by the Philippine Legislature in regard to those two previously mentioned bills.

The Japanese companies are not the only ones waiting anxiously for developments. The largest of foreign operators are vitally

concerned. One of the big Chinese companies has been contemplating a new investment of P.1,000,000 with a program of expansion which would include the building of one or more new units. But they feel that they cannot go ahead with the uncertainty of action on the part of the lawmakers staring them in the face.

The Vera bill, limiting the amount of property which can be leased for lumbering purposes, is causing the most concern. If a large company cannot obtain concessions for more than 5,000 hectares at a time, or 1,024 hectares as the bill now provides, expansion is seriously hampered. Filipino legislators point out that they are permitted under the provisions of the proposed law to acquire more adjoining property as the timber on one stand is worked off, but operators point out on the other hand that there is no assurance that other persons will not come in meantime and grab off the land needed to complete operations begun in a certain territory.

There is much to be said on both sides of the question. Certainly the Philippine government has a right to reserve its own property for exploitation by its own people, especially in this case, where no reciprocity is offered by the home governments of those who come here to take out timber.

On the other hand, foreign capital and foreign enterprise in the lumber industry has without doubt benefited the economic development of the country, which is the end toward which Governor-General Henry L. Stimson is avowedly bending every effort. And it

is a question whether, if foreign enterprise should be curtailed, the Filipinos themselves would properly develop the forest resources of their land to get the greatest possible benefit from them, which is what the Bureau of Forestry wants done.

There seems to be one solution to the problem, but it is so far-sighted that it fails to have much direct bearing on the immediate situation. This is the proper development of home markets for Philippine forest products, both manufactured and raw.

The Filipino, like all Malasian and tropical races, has never been educated to the uses of lumber. As a matter of fact, he has used bamboo as the universal building material to such an extent that cut lumber is unheard-of for building any kind of shelter in most of the Philippine provinces to-day. The Nipa shack of bamboo and grass is the universal home. It has served for centuries, and its picturesque roof of grass set in the midst of waving palms is the symbol for things Philippine.

But men of vision in the lumber industry see tremendous potential possibilities in the development of home markets and uses for lumber. The Filipinos are ambitious and anxious for the luxuries that they see wherever Americans have settled and wherever wealthy Filipinos have emulated their modes of living. With a rising scale of wages for workers, demand for luxuries is bound to increase. The scale is rising, gradually, to be sure, but nevertheless certainly. And with more money to spend, inhabitants of the Philippines will demand more luxuries, more lumber to build with.

Improvement of Streets and Highways in Greater Osaka, Japan

By Vice-Consul George J. Haering, Kobe

THE Osaka City Planning Commission in 1922 formulated plans for the improvement of the city and its environs, and coined the term "Greater Osaka" to designate the metropolitan district, which has an area of approximately 85 square miles and a population of 2,170,153 (1925 figures). The city itself is 65.75 square miles in area and in 1925 had a population of 2,114,804.

Street and Highway Programs

The Planning Commission authorized two programs of public works. The first, intended to be carried out in 1922 and 1923, included, in addition to other improvements, the extension and paving of 42 streets and highways for a total distance of 56.5 miles, and the modernization and paving of 1,080,000 square feet of existing streets.

The second program, not yet authorized by the central Government, is to be carried out during a 15-year period beginning in 1934, and includes the construction of 101 paved streets and highways having a total length of 182 miles.

In addition, the Governor of Osaka-Fu (the Province, or administrative district, in which the city of Osaka is situated) is in charge of an authorized plan for the construction of 10 highways outside the city, aggregating a length of 23.4 miles, to be completed by 1935.

The commission's 1922-23 plan called for the expenditure of Y.149,962,000 (\$67,891,097) on street and bridge construction and improvement. The 1934-1948 program includes Y.211,660,000 (\$95,823,139) for street extension and modernization. The Osaka-Fu highway program will cost Y.27,714,415 (\$11,546,925).

At the end of 1927 about 50 per cent. of the 1922-23 program had been completed, and about 20 per cent. of the Osaka-Fu highway construction had been finished.

In the "Greater Osaka" program for 1922-23, the 56.5 miles of new thoroughfares planned range in width from 42 to 144 feet, and the greater number of these highways, as well as the 1,080,000 square feet of streets to be repaved, will be paved with Douglas-fir blocks resting on a ½-inch sand cushion, on a concrete base 6 inches deep.

Some of the less important streets will be paved with asphalt or tarvia, on a bed of crushed stone 3 to 4½ inches deep.

Sidewalks are of concrete tiles, 13 inches square by 2 inches thick.

Bridge construction and strengthening is of ferro-concrete.

Wooden-block pavements are in favor now, but some other form of paving may possibly be introduced in the future.

Of the 1934-1948 program, details regarding classes of highways planned, their number, width, and length, are given in the following table:

1934-1948 Street and Highway Program of Greater Osaka, Japan

Classification	Number of high-ways			Width (meters)		Total length (meters)
First class	1	24	2,150
"	1	30	7,600
"	3	27	15,250
"	9	22	16,644
"	22	25	127,566
Second class	1	18	960
"	3	13	2,640
"	18	15	40,432
"	43	11	80,018
Total	101	..	293,260

The highways being built under the supervision of the Governor of Osaka-Fu, to be completed by 1925, are listed below, with their important details.

Program of Highway Construction in Osaka Province, Japan

Specific highway	Period of construction	Width (feet)	Length (feet)	Cost (yen) *
National Highway No. 16	1932-1935	90	5,878	1,201,243
Osaka-Ikeda	.. .. 1926-1930	90	3,771	
		78	6,483	6,541,705
		60	14,424	
Osaka-Itami	.. .. 1930-1932	78	11,472	1,379,734
Osaka-Suita	.. .. 1931-1935	78	19,164	6,580,422
		48	5,031	
Osaka-Makioka	.. .. 1929-1931	90	2,131	865,588
		78	3,816	
Abeno-Sakai	.. .. 1926-1935	78	15,783	2,253,802
Denbo-Amagasaki	.. .. 1930-1935	72	10,122	5,983,105
National Highway No. 2	.. 1921 1928	78	14,814	1,613,065
		48	1,326	
Osaka-Judo	.. .. 1931-1932	72	6,036	639,416
Osaka-Nara	.. .. 1932-1935	72	3,270	656,335
Total	.. ..	..	123,521	27,714,415

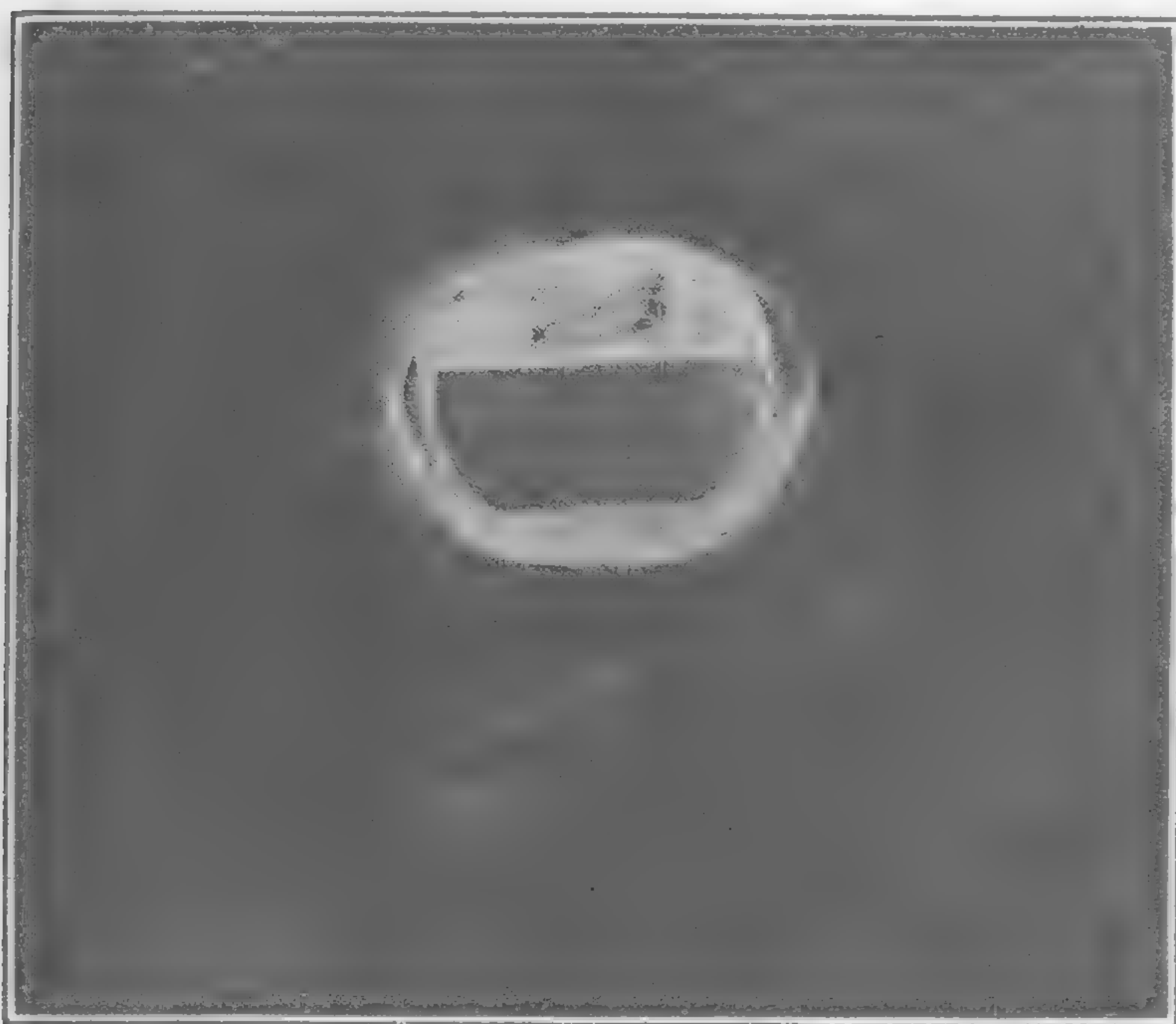
*The yen averages about \$0.47 in exchange.

Scientific Investigation of Comparative Culvert Strengths

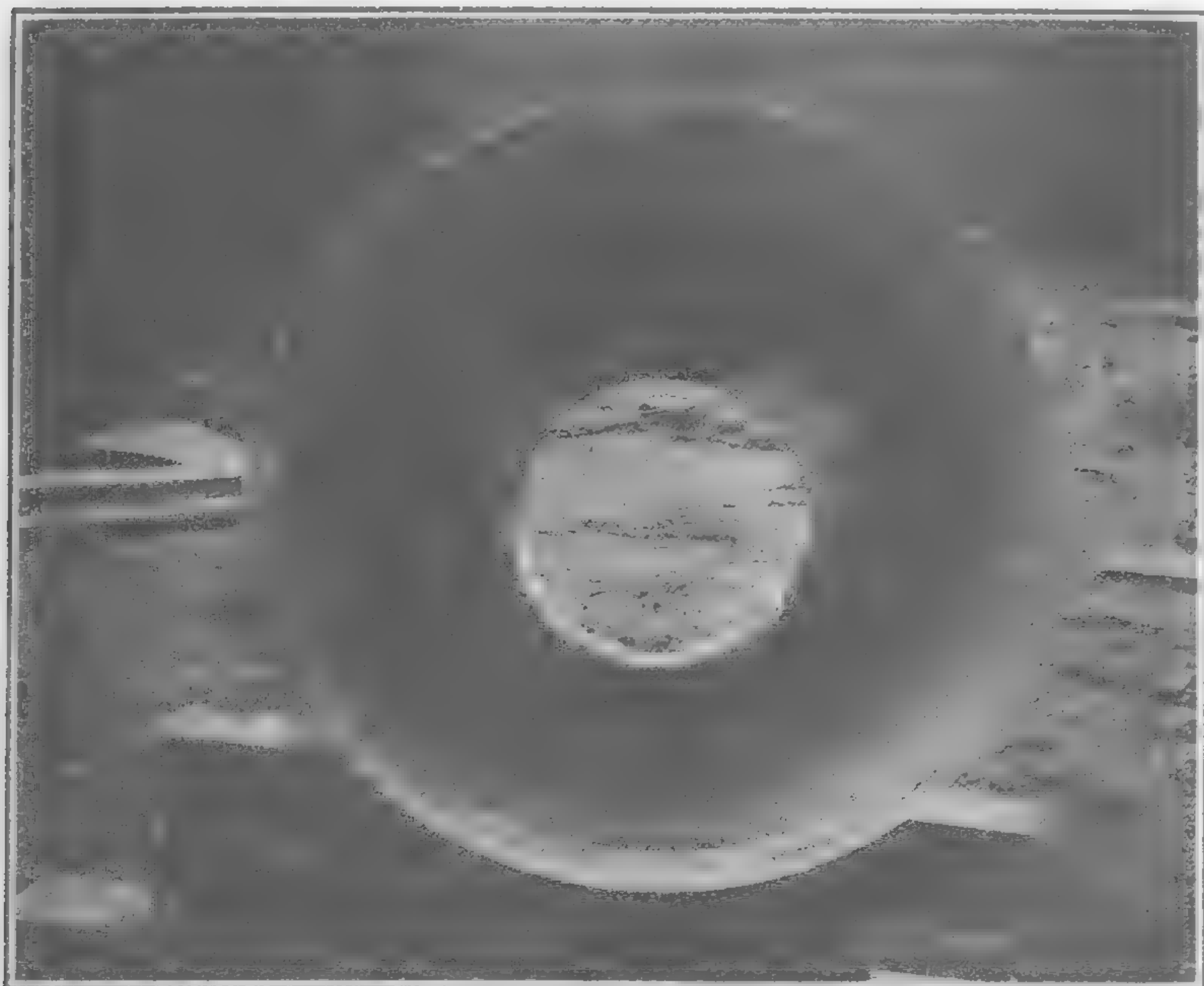
Roadway Committee of the American Railway Engineering Association Conducts Remarkable Inquiry.
Pressures Determined Under High Embankments

By I. Neudatchin, Civil Engineer

THE actual pressures exerted on culvert pipes buried under embankments and the resistances offered to these stresses by the various available culvert materials is a subject upon which the engineering world has had but little data. Usual practice in selecting and installing culvert pipes has rested almost wholly on past experience or individual judgment, with the result that many unforeseen failures have occurred. It has been generally felt that a number of important factors have not been properly evaluated and that a series of carefully conducted tests was necessary to supply the basis of a logical technique.



Preliminary Test No. 1.—Condition of 24-inch Diameter Reinforced Concrete Pipe at Conclusion of the Test



Preliminary Test No. 1.—The 24-inch Diameter Corrugated Culvert at Conclusion of Test

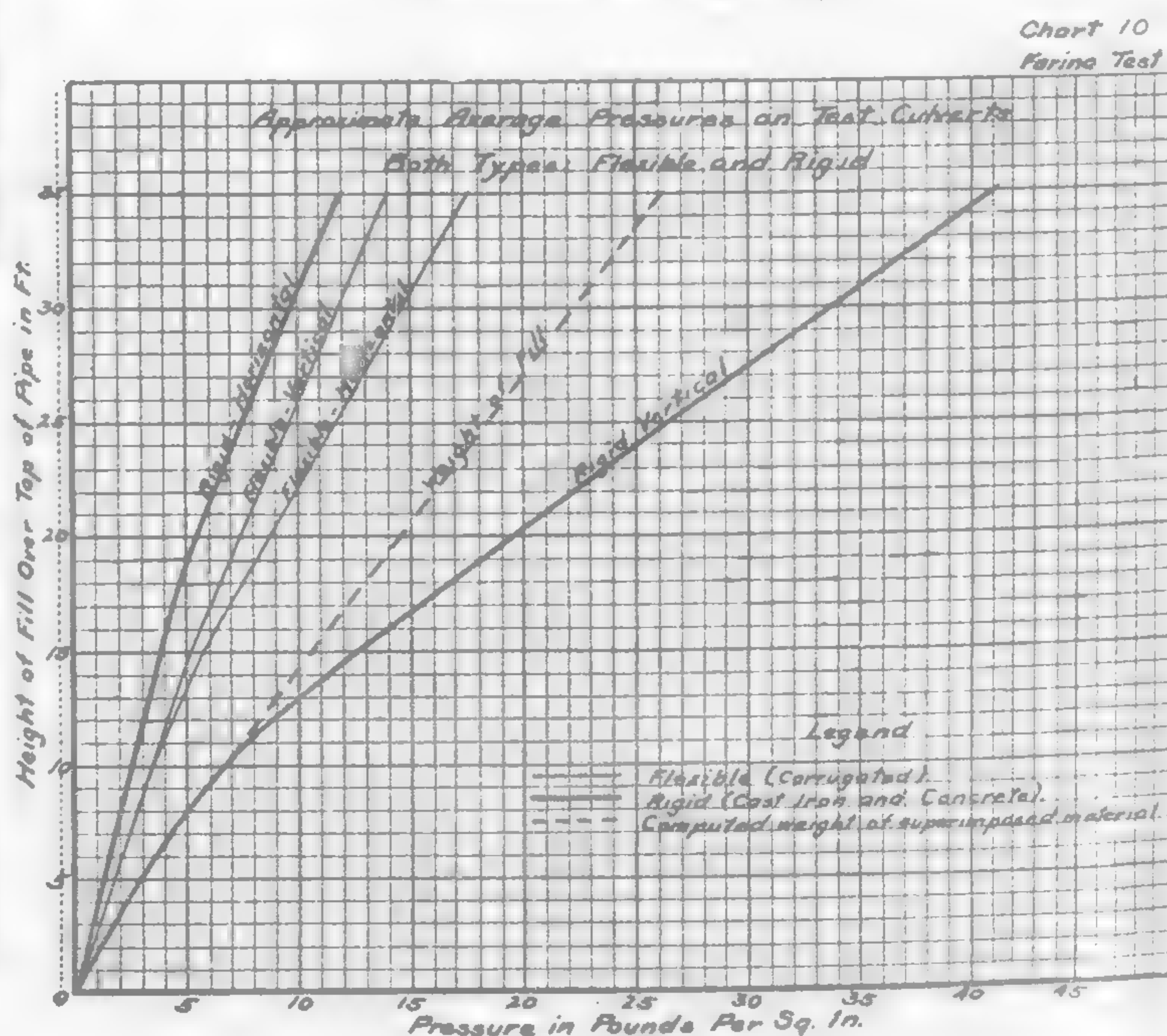
With this situation in mind, the Roadway Committee of the American Railway Engineering Association, about three years ago, began a notable investigation into this subject. Its findings to date are embodied in A. R. E. A. Bulletin No. 284, "Culvert Load Determination," published in 1926, and Bulletin No. 303 "Theory of Culvert Loads" which has appeared this year. These may be obtained from the Secretary, E. H. Fritch, Room 1426 No. 431 South Dearborn Street, Chicago, Illinois, U. S. A.

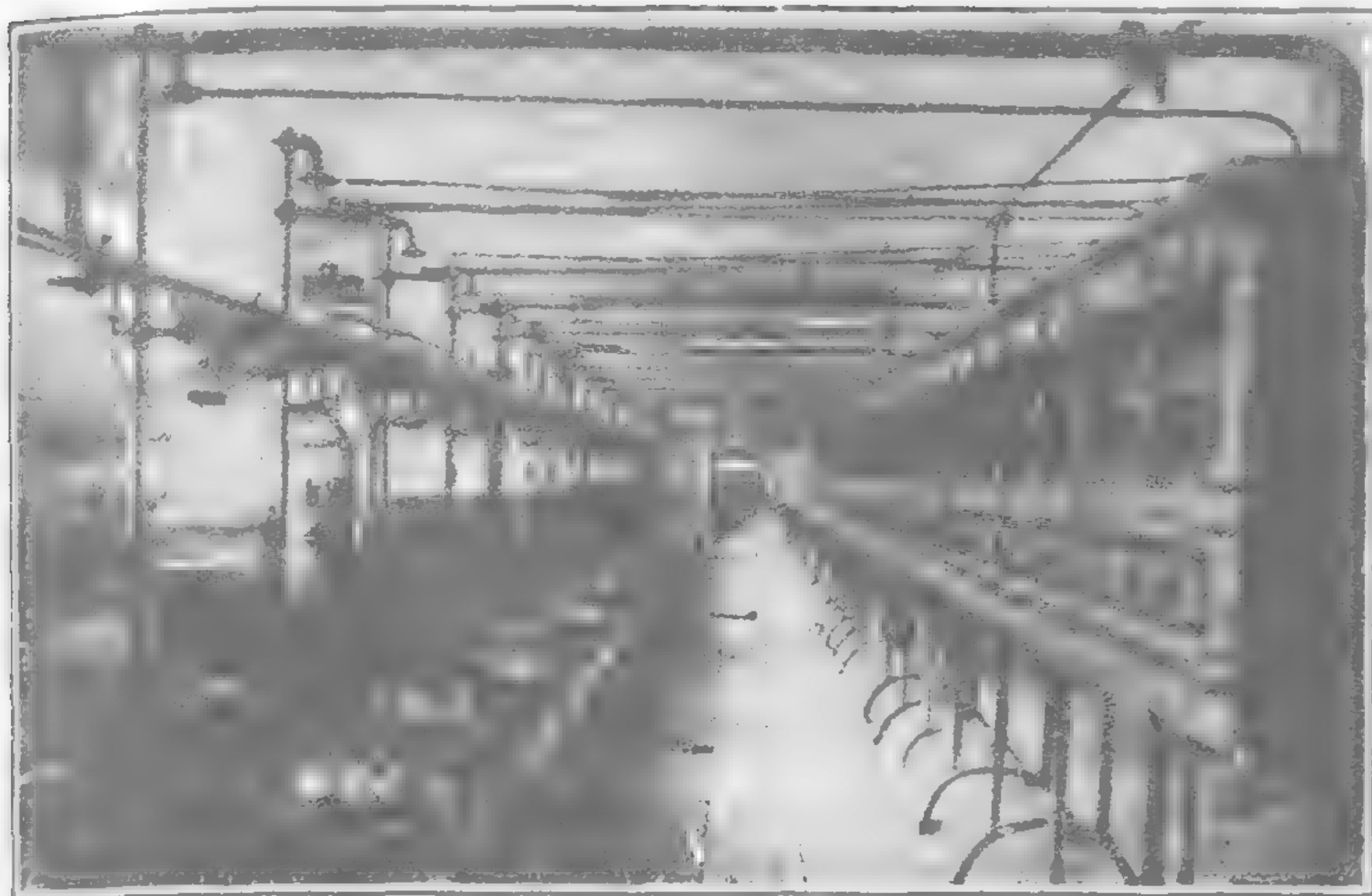
One feature of special interest is the determination of actual pressures encountered in embankments, up to a height of 35 feet, upon rigid and flexible culvert structures. Instruments called Goldbeck Cells were employed, the principle of which is that of balancing the earth pressures on the outsides of the pipes with air pressure from the inside and then measuring the air pressure. These enabled the engineers in charge to make definite record of the vertical and horizontal stresses exerted on the culverts under installation conditions. Similarly exact measurements were made of resulting deflections, and all other developments were carefully recorded.

The outstanding result of the tests was the development of the reasons for the remarkable toughness and serviceability of corrugated pipe under high embankments. It has been established by experience in many countries where these culverts have been extensively employed under highways and railroads that they afford a remarkable resistance not only to the shocks and jars of traffic under shallow covering but to the much greater stresses resulting from high embankments. It seems that the resiliency afforded by their corrugated form and overlapping joints enables them to yield slightly when subjected to heavy pressures, to conform to slightly yielding foundations, and thus to withstand conditions which would soon prove fatal to masonry or other rigid construction.

It was, however, still somewhat surprising that corrugated iron cylinders of the gauges commonly employed in culvert work (ranging from Number 16 for the smallest sizes to Number 8 for the largest) could successfully withstand the conditions under which they were often found in service. These included some instances of such shallow covering that the railroad ties rested almost directly on the corrugated iron, and others of installations under fills ranging from twenty to one hundred feet in height.

(Continued on page 524).





Samarkand.—Silk Filature

The Turkestan-Siberian Railroad

THE Turkestan-Siberian railroad will connect the town of Semipalatinsk on the Irtish River in Southern Siberia with the station Lugovaya on the Pishpen (Frunze) railroad and also with the station Aris 160 kilometers from Tashkent. The new railroad will be 1,500 kilometers long. Freight traffic between Siberia and Turkestan at present is directed by way of the Urals. The railway distance between the leading centers of Siberia and Turkestan, namely Novosibirsk and Tashkent, is at present 4,500 kilometers. When the Turkestan-Siberian railroad is completed this distance will be reduced to 1,200 kilometers. It is estimated that grain freight sent from Siberia to Turkestan will be carried 1,800 kilometers less on the new railroad than at present. It is primarily to reduce the grain haul between the two regions that the new road is being built.

Central Asia with its sub-tropical climate produces and can extend the production of many valuable industrial crops such as cotton, rice, sugar beets, kendir, kenaf, tobacco, crude drugs and probably crude rubber. To sow grain on the Central Asiatic land adapted to the cultivation of more valuable crops is very unprofitable. At present 75 per cent. of all the sown area is under grain crops, while only 25 per cent. is sown to industrial crops. The problem on hand is to extend the area under industrial crops, which will result in increasing the supplies of raw materials for textile and other industries.

The extension of the industrial crop area is conditioned upon the supply of grain in the region. The present insufficient transportation facilities force up the price of grain in Central Asia, with the result that the native population is compelled to use its land to grow grain crops for its own needs. In order to double the area under industrial crops Central Asia must be supplied with at least 1,250,000 metric tons of grain annually, at a price no more than half as high as that prevailing at present. The necessary quantity of grain at the required price can be easily obtained in Siberia where there are large areas of unused fertile lands and where development of agriculture is hindered by the lack of railroads and therefore of markets. At present the price of wheat in Central Asia is five or six times as high as in Siberia (a pood of wheat costs 40 to 50 kopeks in Siberia, and from 2.50 to 3.00 rubles in Central Asia). The Turkestan-Siberian railroad will make it possible to deliver wheat to Central Asia at a price of from 1.20 to 1.50 rubles per pood (36 pounds). At the same time the Turkestan-Siberian railroad, besides reducing grain prices in Central Asia and increasing the area under industrial crops, will permit a part of the crops of the Northern Caucasus and the Volga district to be exported instead of being consumed in the U. S. S. R. The agricultural development of Siberia will be another of the important effects of the construction of the railroad. Siberia can supply Central Asia with an unlimited quantity of timber which Central Asia is badly in need of, and also with coal, iron and other materials.

The Turkestan-Siberian railroad will cross the Kazak Autonomous Republic which, although equalling in area France, Germany and Italy combined, has only 2,000 kilometers of railroads.

At present the native population of the Republic is extremely backward culturally and economically and is engaged largely in cattle raising. There are practically no towns and little cultivated land. The native population together with its cattle and tents moves from one place to another. However, practically all of the territory along the Turkestan-Siberian railroad is suitable for agricultural purposes. It is estimated that the area economically dependent upon the railroad exceeds 685,000 square kilometers, while the total sowings in the region amount to only 1,315,000 acres. The density of population of the section is only $2\frac{1}{2}$ per square kilometer. The region has a large number of cattle and horses (horses 1,250,000 head; large horned cattle 1,570,000 head; sheep 7,000,000 head; other cattle 1,100,000). The yearly increment is estimated for horses at 7.8 per cent, large horned cattle 13 per cent. and sheep and goats 12 per cent.

There are vast tracts of timber in the sections bordering on the Turkestan-Siberian railroad. The estimate has been made that in the northern part of the region alone there are at least 10 million acres of forests which have not been exploited because of lack of transportation means. In the southern part of the region there are more than 17 million acres of forest land.

The Turkestan railroad will traverse a region abounding in rich mineral resources including coal, manganese, graphite, alabaster, salt, oil, gold and precious stones. Of the non-ferrous metals the former Urquhart concession alone is expected within five years to produce 250,000 metric tons of zinc, lead and copper annually. In other sections deposits of nonferrous metals are also of great magnitude. In the mountainous sections of the region many beautiful spots with medicinal springs are located. These could be the sites of excellent resorts.

The new railroad is expected to be called upon to transport large quantities of freight, especially furs, wool, leather, cotton, rice, and timber from several sections of Western China and Kashgar to the U. S. S. R. It will also permit the establishment of river transportation on the Irtish and Ili rivers.

The annual freight turnover of the Turkestan-Siberian railroad for the year 1931, when completion of the road is expected, is estimated at 1,500,000 metric tons. In the following years the turnover is expected to increase very rapidly. By 1936 the Turkestan-Siberian railroad is expected to carry at least 3,000,000 metric tons of freight annually with large increases from year to year, in view of the tremendous natural resources of the region, which have been heretofore little exploited.

The region which the railroad will traverse presents varied characteristics. In the northern and central sections the surface is very flat. However, in the southern part of the region from the Karatel River to the town of Alma-Ata (formerly Verny) high mountains are found. From Alma-Ata to the point where the Turkestan-Siberian railroad will meet the Pishpen (Frunze) railroad a high mountain range Ala-Tau is located. The railway will pass through the Chokpar Pass, which is located 1,200 meters above the sea level.

The great difficulties presented by the construction of the railway in isolated regions are aggravated by the fact that these mountainous regions are susceptible to earthquakes. Hence it has been decided not to build any tunnels in these sections. There have been 25 plans offered to pass through the mountain range in the region. Investigations have been carried on for almost 20 years, and only last year was it possible to find a satisfactory road, which does away with the necessity of constructing tunnels. The grade of the road never exceeds 0.8 per cent.

The total cost of the Turkestan-Siberian railroad, including rolling stock and the necessary operating capital, will amount to 220,000,000 rubles, which is distributed as follows:

	Rubles
Earthwork	45,000,000
Rails, ties, etc. .. .	37,300,000
Bridges, viaducts, etc. .. .	35,700,000
Station buildings .. .	16,300,000
Other buildings .. .	6,100,000
Water supply .. .	10,200,000
Rolling stock .. .	36,000,000
Operating capital .. .	10,000,000
General and other expenses .. .	23,400,000
Total .. .	220,000,000

The construction of the railway will require: 560,000 cubic meters of timber, 2,500,000 ties, 156,000 tons of rails, bolts, etc., 45,000 tons of pig iron, 100,000 tons of cement, 500,000 sq. meters of glass.

Stone and sand can be found in unlimited quantities. The ground of the region is unusually hard. In the mountainous sections 8 per cent. consists of granite and other hard stone. In the other sections which the railroads will traverse 75 per cent. is hard, 20 per cent. of medium hardness and only 5 per cent. soft.

Twenty-five steam shovels will be employed on the construction of the railroad. Several large bridges will be built, one of 600

meters across the Irtysh river, near Semipalatinsk, one of 60 meters across the Ayaguey river, 3 bridges of 120 meters each across the Lepsa, Akst, and Karatel rivers, and one bridge of 80 meters across the river Chu.

During the first year 45 station buildings will be constructed. The station buildings will be constructed of brick, stone or concrete, in accordance with the local conditions. There will be five round-houses, each of which will hold from 15 to 20 locomotives. Each round-house will have a repair shop for medium and light repairs to the rolling stock.

The administration of the road will be located at Alma-Ata, the capital of Kazakstan. Coal will be used for fuel. Supplies of coal can be obtained in the region and can also be delivered from the Kusnetky Basin.

The Turkestan-Siberian railroad is expected to take four years for construction and will start operating in 1931. The first year of operations is estimated to bring a revenue of from 28 to 30 million rubles. The annual operating expenses, based on the average for the U. S. S. R., will be close to 18,000,000 rubles. The profit of 12,000,000 rubles will amount to 5 per cent. of the capital invested.

For 1936 the estimated revenue and expenditure is as follows:

	Rubles
Revenue	55,000,000
Expenditure .. .	35,000,000
Profit .. .	20,000,000

The profit of 20,000,000 rubles will amount to about 10 per cent. on the capital.

Therefore, it can be seen that as a commercial proposition the railroad will be profitable, aside from its principal purpose of helping in the economic development of the backward sections of the U. S. S. R.

Note:—The Railway in question is already under construction and about 400 miles is completed in this year. It seems that the Railway will start operating on 1930 instead of 1931.

Scientific Investigation of Comparative Culvert Strengths

(Continued from page 522).

It now appears that rigid culvert structures installed under high embankments have to endure vertical pressures not merely equal to the weight of the material directly over them but considerably in excess of this,—amounting in many instances to a fifty per cent. increase—and that flexible pipes, on the other hand, are able to distribute the pressures so nearly equally around their perimeters as to be subjected to vertical pressures of considerably less than the weight of the material over them. In other words, rigid conduit structures under embankments are subject to very high bending moments, while the flexibility of corrugated pipes reduces bending moments to almost negligible proportions, thus approaching the conditions of hydrostatic pressure. The accompanying diagram, taken from Bulletin No. 284, gives results of the principal tests conducted by the Committee at Farina, Illinois, U. S. A., and shows these relations very clearly.

The two photographs shown herewith, which are also taken from the bulletin, give the results of a preliminary test under a shallow fill in which the pressure was applied by means of jacks and an oil pump through a cast-iron plate. The 24 inch reinforced concrete pipe, made according to State Highway standards, was completely ruined by pressure which produced but a slight flattening on the ten gauge corrugated iron pipe of the same diameter.

Corrugated Culverts, when made of high purity iron and well galvanized, have established a very satisfactory record of durability. The data accumulated in this investigation as to their strength under severe service conditions will doubtless lead to their greatly increased employment, especially where foundations are more or less yielding or where earth movements result from alternate freezing and thawing.

New Soda Ash Plants for Japan

With the completion of the proposed 50,000 ton soda works of the South Manchuria Railway next year and the extension of existing plants it is confidently hoped that Japan will be able to free herself from further importations of the product. The present consumption of soda ash in Japan is about 135,000 tons of which 100,000 is imported. The normal rate of increase in consumption is from 10 to 20,000 tons. The Tokata plant of the Asiatic Glass Manufacturing Co. is rushing the completion of its new equipment which will bring its total annual producing capacity up to 30,000 tons while the Tokuyama plant of the Japan Soda Industry Company is preparing plans that will also extend its output to 35,000 tons. These new plants in addition to the projected S. M. R. Works, will therefore make Japan independent in an industry that is indispensable for many other manufacturing activities and for the production of gun powder and poison gas in the event of war.

New Thornycroft Busses for Hongkong.—John I. Thornycroft & Co., Ltd. have just received a repeat order from the Kowloon Bus Co., of Hongkong, for four 32-seated forward-control low-loading bus chassis, which are to be fitted with locally-built bodies. It is interesting to note that this order is a sequel to the very successful service rendered by 10 similar chassis which were supplied early this year. Another large user of passenger vehicles in Hongkong is the China Bus Co., their first order having been placed as long ago as September, 1924, and since this time have received repeat orders from them for six 20-seated omnibuses complete and ten 20-seated bus chassis with full passenger equipment.

The six saloon bus bodies were of special design, having two compartments each, one seating eight first-class passengers, and the other 12 natives. The driver's compartment was fully enclosed and fitted with a glazed partition, while a sliding partition separated the first class and native compartments.

All the above vehicles have been ordered through Shanghai and Hongkong Offices of John I. Thornycroft and Co., Ltd.



Rama VI Bridge As Seen From the River

The Rama VI Bridge

THE most notable event connected with the year's working of the Siam State Railways was the formal opening of the Rama VI Bridge over the Menam. The ceremony was performed on January 1 by the King of Siam in the presence of a brilliant assemblage of Court Dignitaries, Government Officials and Foreign Ministers. A full description of the abutment and pier construction of this bridge was published in the April 1927 number of the FAR EASTERN REVIEW.

The bridge is of the cantilever type having 5 spans. The central span is 120 m. long and consists of two cantilever arms each 41.50 m. and a simple suspended truss 37 m. long in the center. The intermediate spans are the anchor spans each 84 m. long and the two end spans are each 77.04 m. long. Each of the latter is composed of a cantilever arm 41.50 m. and a simple truss 35.54 m. long.

The total length between centers of bearings from abutment to abutment is 442.08 m. The river here is only 300 m. wide but land spans are introduced to allow for the passage of flood water as well as to provide for any further widening of the river. The width of the bridge is 10 m. between centers of main trusses and provides for a roadway 5 m. wide as well as meter gauge railway track. Footpaths 1.50 m. wide are provided on the outsides on cantilever brackets.

At present however the roadway which is on the North and the footpath on that side are not being built because there is no prospect of a road just yet.

The main stringers, floor beams and timber floorings remain to be put in to complete the road bridge. As now built it contains 2,538 tons of mild steel, 69 tons of cast steel and 24 tons of forged steel. The bridge was designed for the following loads, with an al-

lowance for impact of $I = \frac{50}{L \times 45}$ (where L=loaded length in meters.)

LIVE LOAD FOR THE RAILWAY full live load as given by the train load plus an extra of 10% on the wheel loads of locomotives and tenders.

LIVE LOAD FOR THE ROADWAY—A uniform live load of 560 kgs. per sq. meter but the girders and stringers which support the flooring to be able to withstand an axle load of 7 tons of a steam roller.

FOR THE FOOTPATH—Full live load of 450 kgs. per sq. meter.

WIND LOAD—150 kgs. per sq. meter on bridge plus same amount on moving train. 3.50 m. high and 0.50 m. above the rail.

BEARINGS.—All the bearings at both abutments and piers are on rockers. At the land piers the underside of the



Rama VI Bridge



Staging for the Central Span Being Erected Under the Bridge and Steel Barges Ready to Receive Same for Transport to Position

rockers rest on rollers to allow for expansion movements, while at the river piers they are fixed. At each abutment the rockers rest on bronze plates and are free to move although the end span is here anchored to the center of the abutment. Where the simple truss at each end connects with the cantilever arm, sliding joints are provided. The end verticals of the simple truss are bracketed out and fit inside the end verticals of the cantilever arm. A bronze plate is fixed on the lower part of the latter. On this rests the rocker bearing, the top part of which is fixed to the end vertical of the simple truss. The two parts are also anchored against wind pressure by brackets similar to those at the abutment. They are fixed to the center of the cross girders and connected together by a pin. The only difference is that the hole is slotted longitudinally instead of being round, thus allowing longitudinal movement due to expansion while fixing the two trusses together against transverse movement.

Similar arrangements are provided at the central suspended truss but the rockers at one end are fixed while those at the other end are free to slide.

Erection and Launching

There is nothing out of the ordinary with regard to the actual erection of the superstructure but the method adopted for moving the bridge into position over the river is interesting and it is claimed to be the first time that it has been employed on a cantilever bridge.

Strong staging on piles was constructed between the land pier and abutment and for a distance of 50 m. behind the latter. The whole surface of the staging was floored with planking 5 cms. thick to facilitate work on top during erection. The cantilever arm of the river span was first erected on the staging and supported by jacks at various points. To the front of this was attached a light truss, triangular in shape

known as the "Avant bec." This truss is 42.27 m. in length. A traveling crane 24 m. high was used for the erection work. It had electric traveling winches on top, each capable of lifting 6 tons.

For the erection (and dismantling) of the "Avant bec" a traveling gantry on the top chords of the cantilever was used and the "Avant bec" was built out piece by piece towards the apex.

As much of the first portion of the bridge as the staging would allow was erected. Then the bridge was lowered down on sets of rollers similar to solid wheels with an axle 13.0 cms. diameter projecting 19.5 cms. on each side. Each is 50.8 cms. in diameter and 9.4 cms. wide.

The edges of the rollers are bevelled. They were placed in pairs on rockers which have bearings to receive them. The rockers were again placed on another cantilever arm that can also rock on a bearing which rested on a set of grills on the staging. Thus the wheels or rockers were not fixed horizontally and can move up or down.

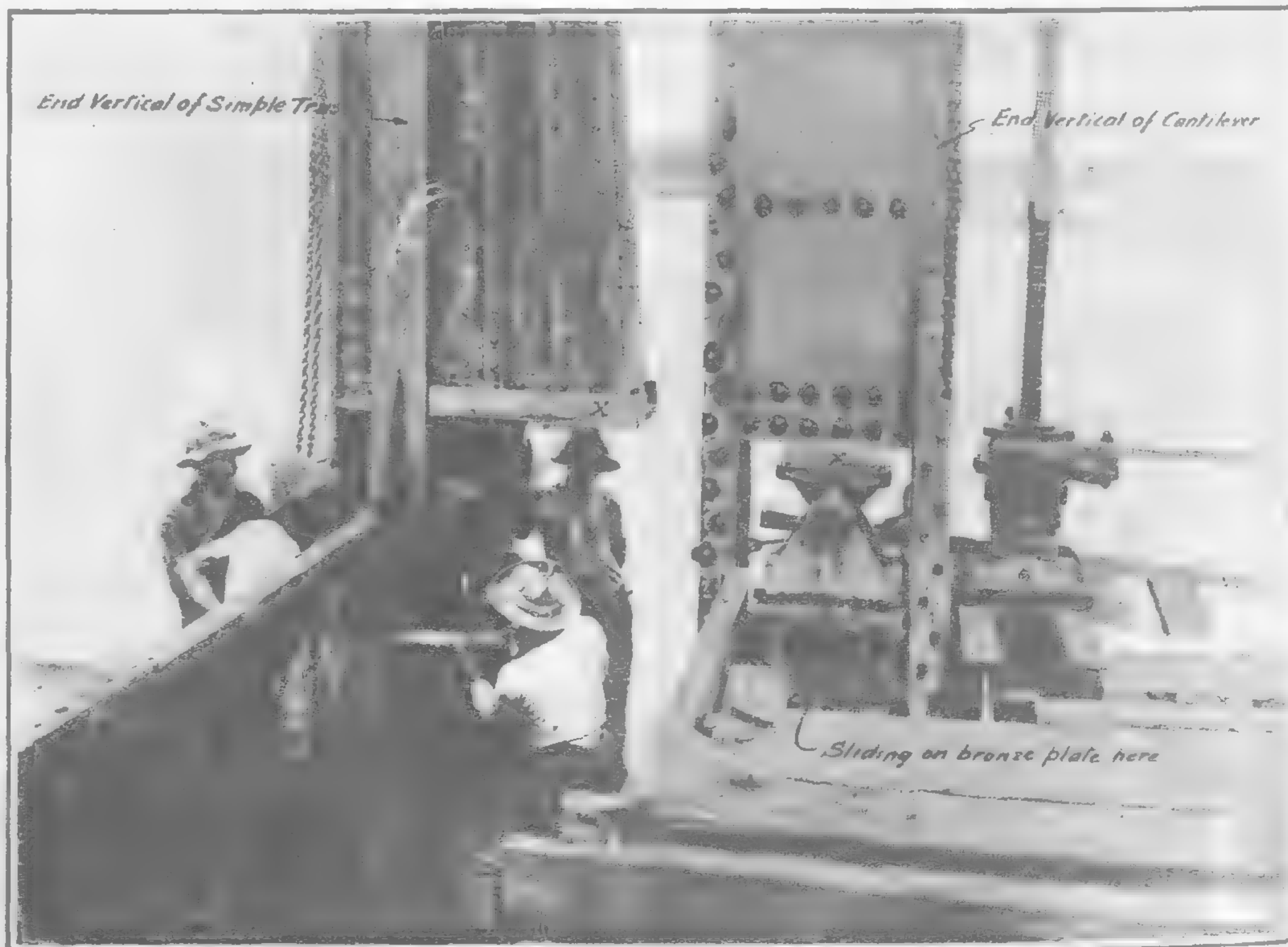
This was necessary in order to obtain proper bearings under the bridge because the bottom booms are not all in

the same plane. At some places naturally there are more thicknesses of plates than at others.

In order to allow the bridge to move smoothly over the rollers at the places where there are different thicknesses of plates a wedge piece is placed at each change of thickness thus:—



These rollers fitted in between 2 rows of rivets which acted somewhat as guides when the bridge moved. When the bridge has been lowered on these rollers all other supports were removed and the



Rocker and Sliding Bearing Where the Simple Truss Rests on the Cantilever Arm. The Projection is Bolted to the Top Rocker at X.

bridge was ready to be moved. In this position the bridge was about 7 cms. higher than its final level.

Launching Winch

This is a heavy piece of gearing mounted on a steel frame-work on wheels set 6.44 m. apart across the bridge. A temporary track was laid on the bridge so that the launching gear could be moved along when required. The power was a small electric motor of 11 h.p. (220 volts, 50 cycles) with a speed of 975 r.p.m. This was placed in the center on top of the machinery and was geared down on both sides in the same ratio to two large cast iron drums at the extreme ends.

Each of these drums weighs 6 tons. 1,866 revolutions of the motor give one complete turn to each drum. Fixed to each side of the frame-work, projecting downwards just inside the main trusses of the bridge is an arm L.

For moving the bridge this arm L was temporarily bolted to the main truss and thus the Launching Winch was fixed to the bridge. Wedges were also placed under the wheels. To the bottom of each arm was fixed a large pulley C, 1.30 m. in diameter. These pulleys are 7.96 m. apart.

D is a built up steel frame resting on a staging on the river side of the pier and butting up horizontally against the pier. On each side was also fixed a pulley C corresponding to the pulley C' on the winch. The winding cables used each had a diameter of 4.7 cms. One end of each cable H was fixed to the arm of the winch at E. The other end passed round the pulley C at D. It doubled back to pass round pulley C', went up to the drum and was fastened there.

When the motor was started the drum moved and wound in the cable. Thus the winch moved itself and the bridge forward by pulling on the pier which had been reinforced to take this stress.

The speed of launching was about 12 meters per hour, i.e. the bridge moved out at the rate of 20 cms. per minute.

Each half of the bridge was launched from one side of the bank in a similar manner.

The first half was erected on the East bank and launched out. Then the staging was removed and re-erected on the West bank.

The Erection of the Central Simple Truss

It was decided to erect this simple truss, 37 m. span, in place on staging. The members of the dismantled "avant bec" with some supplementary pieces specially

made for the purpose were used. This staging was in the form of an inverted triangle and was erected suspended under the main bridge span between piers 4 and 5.

The pieces were transported there for erection by barges.

When this staging has been completely erected it was lowered on to the two steel barges, first used as the floating plant for the sinking of river caissons. The staging was made fast to wooden frames specially built on the steel barges and the whole towed into position under the gap between the 2 cantilever arms of the central bay.

At each corner of the cantilever arms was temporarily fixed the 30 ton screw-jack used for holding the caisson at the floating plant. The staging was attached to these 4 jacks at

the 4 corners while still being supported by the steel barges and held in position by cables and a tug boat. The bolts holding the staging to the barges were removed and the staging jacked up free of the barges. This operation was done when the tide was highest and there was

practically no current. The staging was jacked right up under the cantilever arms and fixed to same at specially prepared places by bolts. One end was fixed while the other was allowed to move when the temperature changed.

The main triangular trusses of the staging were 10 m. apart, the same distance as the main girders of the bridge but its cross girders were cantilevered out on each side. On these were erected the runways for a traveling crane and the simple truss was erected in the usual way. When this was completed the staging was dismantled piece by piece from the erected bridge and taken away by barges.

The steelwork was painted with 2 coats of zinc oxide compounds grey in color.

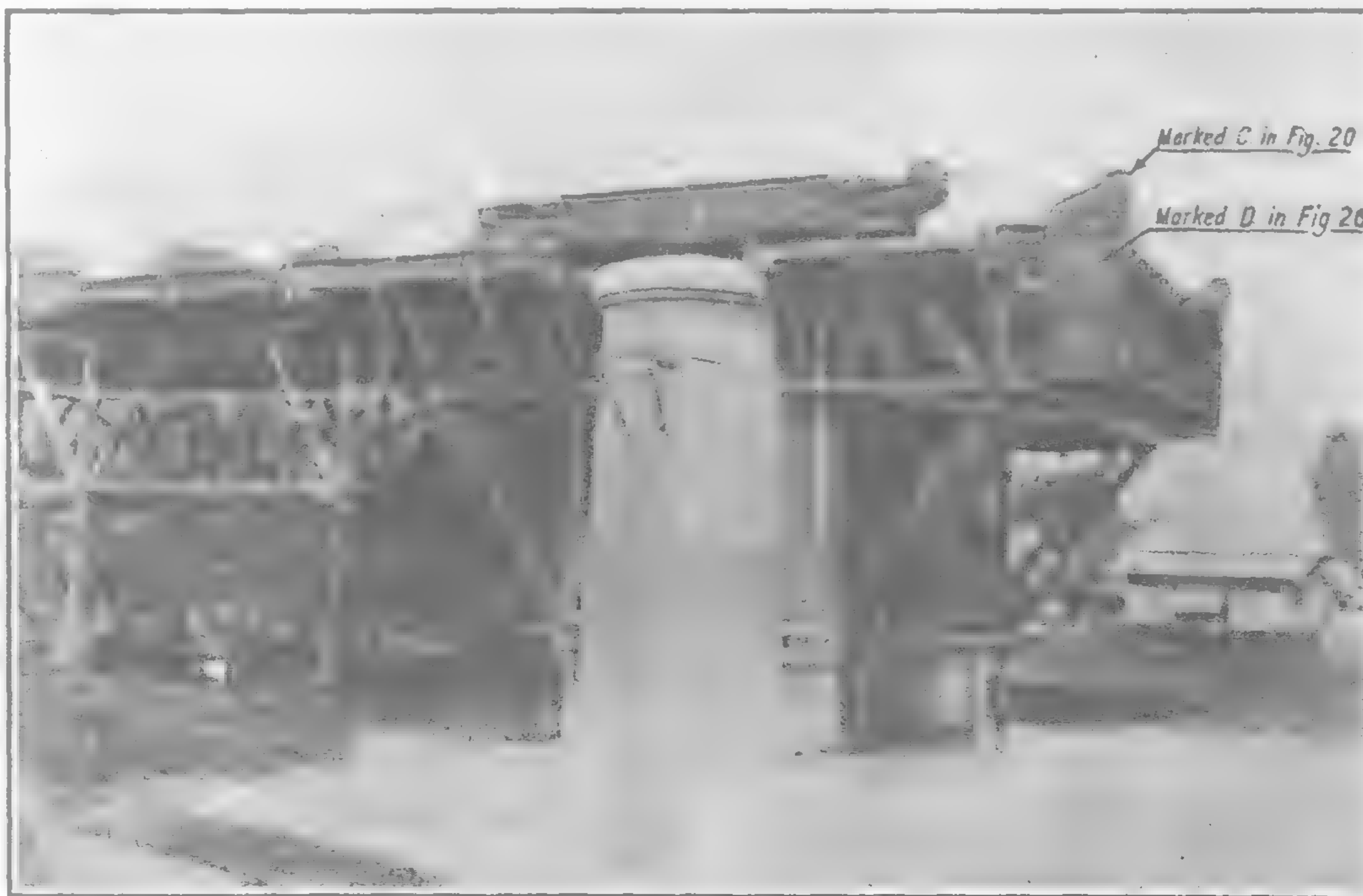
The Bridge was opened by His Majesty King Prajadhipok on

January 1, 1927, being the date of the birthday of King Rama VI. in whose reign it was commenced.

His Majesty entered the Royal Train at Chitra Ladda Station, stopped to perform the opening ceremony at the Bridge and passed over it to detrain at Bangkok Noi Station. The Southern express was the first passenger train to pass over the bridge on its way to Hua Lampong Station that night. The bridge took practically 4 years to complete at a cost of nearly three million ticals.



Sixth Stage in Launching; Part of "Avant Bec" Removed. The Next Move Brings the Bridge Into Its Final Position



Roller Bearings Etc., for Launching the Bridge

Engineering Notes

LONG DISTANCE TELEPHONE FOR HOPEI.—The Bureau for Constructive Works of Hopei (Chihli) province has decided to instal long distance telephone services in different parts of the province. A committee has been appointed to make preparations.

NANKING TELEPHONE EXTENSION.—The Nanking Municipality has asked for an appropriation of \$1,250,000 for the extension of the telephone system in Nanking and for the installation of a long distance telephone system linking up Shanghai, Peiping and Tientsin.

CHINKIANG AND TONGSHAN HIGHWAY.—Plans are being made by engineers for building a motor highway between Chinkiang and Tongshan, Kiangsu province. Work will begin toward the end of October and the sum of \$20,000 is appropriated for this purpose.

MOTOR HIGHWAYS FOR HUNAN PROVINCE.—The Hunan Provincial Government has decided upon an extensive program for the construction of motor highways between all important centers throughout the province such as Changsha, Yiyang, Paoking, Wukang, etc. Disbanded soldiers will be employed for the purpose.

CHINESE PETROLEUM COMPANY.—The Kwang Wha Petroleum Company, Ltd., is now in process of organization under the leadership of Hsu Shih-yin, former Premier of the Peking Government. The capital will be \$1,000,000, but operation will start as soon as one-fourth of the amount is subscribed. Licenses for the oil ponds have already been delivered and building construction is being carried out.

NEW CIGARETTE FACTORY IN SHANGHAI.—The newly constructed factory of the San You Tobacco Co., Ltd., at 218-219 Chiu Keng Li, Yalu Road, Shanghai, has recently started making cigarettes. It is capitalized at \$30,000, has two machines of Chinese make, and employs 20 male and 50 female workers. The average daily output is 12 cases containing 50,000 cigarettes. Two brands are on the market, May Long and Redlamp, and a third will be the Welcome brand.

JAPAN WILL HAVE LARGEST TRANSMISSION STATION IN ORIENT.—The "Asahi" reports that the construction of the wireless transmission station, which was being erected at Isami-mura in Aichi Prefecture since January last year, has almost been completed. The plant is equipped with a high frequency current dynamo of 860 kilowatts, and antenna towers each measuring 820-ft. in height, the entire installation costing the authorities six million yen in round figures. It will be the largest plant in the Orient and be ready for service in January, next year.

JAPANESE GOVERNMENT RAILWAY PLANS FOR 1928.—It is announced that during 1928, Y.51,560,000 (\$25,780,000 at par of exchange) will be expended in connection with the construction of new railway lines in Japan according to Assistant Commercial Attaché J. H. Ehlers, Tokyo. The sum of Y.170,391,000 (\$85,195,500) will be expended on improvement works including the improvement of stations, replacing of light rails with heavier sections, work on tunnels, electrification, etc. The original plan called for the expenditure of Y.80,000,000 on new construction, but drastic reduction took place to the above figure as a result of the political situation. The main office of the Japanese Government railways is located in Tokyo.

TSANG-SHIH RAILWAY.—The Ministry of Communications has voted \$30,000,000 for building the Tsangchow-Shihkiachwang Railway.

LONG DISTANCE TELEPHONE SERVICE.—Preparations are being made by the Chinese authorities for the installation of a long-distance telephone service between Paoshan and Tachangchin. The proposed line will be 26 miles long and will connect all villages within the limits of the Paoshan District.

AIR PASSENGER SERVICE IN KWANGSI.—According to a program formulated by the Kwangsi Provincial Government for the inauguration of an air passenger service in Kwangsi, the main station of the new air line will be at Liuchow, the new capital of Kwangsi. Branch stations will be established at Wuchow, Kweilin, Sunchow and Lungchow. It is hoped to extend the service later to Canton, Hongkong, Swatow and Hankow.

NEW MOTOR COMPANY IN HONGKONG.—A Hongkong Syndicate has recently organized a motor company for passenger service with 40 cars brought from England. The smaller cars hold five persons, and the larger 16. Charges are based on mileage, 40 cents for the first mile and 10 cents for each succeeding quarter mile. The company has captured 70 per cent. of the automobile business of Hongkong and cars formerly doing tramp business have ceased to compete.

NEW COTTON COMPANY.—Prominent cotton merchants in Tientsin have organized the Yu Hwa Cotton Trade Company, aiming at improvement in the cultivation of Peiho cotton and the encouragement of its use in cotton mills. Peiho cotton was considered the best in the north, its staple being longer and color better than other kinds and suitable for weaving 32 counts of fine cloth. But unfortunately unscrupulous merchants have lately tried many ways to adulterate it, or even to counterfeit it with other species of cotton so as to make large profits. Consequently consumers' confidence in Peiho cotton has greatly declined and they have imported foreign cotton to take its place, indirectly affecting the business of cotton mills by forcing the use of the more expensive imported article. In order to reinstate Peiho cotton, the new company intends to educate farmers in modern methods of planting, and to prevent the adulteration of Peiho cotton and to widely advertise its good qualities as compared with foreign cotton.

LONG DISTANCE TELEPHONE SERVICE FOR HUPEH.—The Provincial Reconstruction Department of Hupeh is undertaking a long distance telephone project for the Hupeh Province. Mr. H. O. Kung, formerly Westinghouse Electric Manufacturing Company, Pittsburgh, U. S. A. and newly returned student from America, is in charge of design and construction.

There will be seven trunk lines radiating from Hankow reaching different parts in that Province. Sixteen branch or local lines will link up the various cities and important towns. There will be provided three talking circuits between Hankow and Shasi and another three circuits between Hankow and Ichang. Ichang may call Shasi either over the trunk line or through the local.

The total cost for this project is estimated to be \$600,000. Of which 88.3 per cent. will be the cost of line materials, 1.7 per cent. for the telephone sets and switchboards, and 10 per cent. for the construction and labor.

The work is being done very rapidly. The trunk lines between Hankow and Shasi, Hankow and Ichang, and Hankow and Fang Cheng will be started for construction as soon as they get the line material.

TWO MOTOR ROADS FOR KIANGSI.—The Kiangsi Provincial Government is now planning the construction of the 114 mile motor road from Kiukiang to Chingtehchen and the 80 mile road from Nanchang to Linkiang. On the completion of these roads, the Provincial Government will negotiate with motor companies in the United States for the purchase of motor cars on the instalment plan, using the receipts of the roads as security. The companies may be allowed to control the receipts until the cars are paid for.

YALU HYDRO ELECTRIC SCHEME.—Investigation for the possibility of generating electricity by using the current in the Yalu River is going on under the auspices of the South Manchuria Railway Co. The first period of three years for the work carried on at a place called Tsingshuili, about 60 miles above Antung, having been completed, further three years will be spent for the second investigation there, experiments being carried out simultaneously at Wei Yuan, a place some 40 miles above Tsingshuili. The plan provides for the generation of one million kilowatts of electric power at an outlay of forty million yen, as power produced in less quantity will prove uneconomical. But the consumption of the whole of one million kilowatts is impossible in Korea and Manchuria where no large manufacturing centers exist, and not more than 800,000 kilowatts will be needed by the S.M.R. even if all the lines of the company were electrified.

ORDER FOR TURBINE DRIVEN EXHAUST FANS FOR MANCHURIA.—The Dairen branch office of Sulzer Brothers' Kobe house has received an order for eight turbo fans, intended for exhausting Mond gas. The plant will be installed in the Fushun Colliery of the South Manchuria Railway Company, located about 20 miles east of Mukden. A compressor plant and several pumps of our make have been in service there for some time.

Each of the fans is to handle 53,000 cub. ft. of gas per min. at a pressure difference of 31½ in. W.C., and will be direct driven at 1,400 r.p.m. by a 400-H.P. Sulzer steam turbine. Each turbine has one impulse wheel with three velocity stages and is built for the following steam conditions:—

Admission pressure ..	160 lb.
„ temperature ..	450°F.
Back pressure ..	4½—7 lb.

The steam exhausts into the blower piping of the gas producers.

INCREASE IN JAPANESE PIG IRON CAPACITY.—Several projects calculated to materially increase the Japanese production of pig iron are under consideration, according to current reports. They include the installation of two 500-ton blast furnaces in the Government steel works at Yawata and one 500-ton furnace in the Anshan works of the South Manchuria Railway Co.; the conversion of two of the three 100-ton furnaces in the Wanishi plant of the Japan Steel Works to furnaces of 200-ton capacity and one to 160-ton capacity; the conversion of a 150-ton blast furnace in the Tsurumi plant of the Asano Dockyards to one of 300-ton capacity; and the installation of a 200-ton furnace in the Kamaishi Iron Works.

Should these projects be carried through to completion, a 700,000-ton increase in the Japanese pig iron capacity will result, bringing the total capacity up to approximately 2,500,000 tons a year, or practically sufficient to meet present requirements for this product, and obviating the necessity of importing large quantities. The success of the plan, however, centers about the ability of the Japanese to secure adequate supplies of iron ore with which to operate both the existing furnaces and those projected. Japan is, at present, importing pig iron from British India, Manchuria, and Korea.

STEAM LAUNCH SERVICE FOR THE YELLOW RIVER.—Kansu authorities have decided to remove the reefs and sand bars in the upper reaches of the Yellow River by dredging and dynamiting. A steam launch service will be operated between Paotowchen and Lanchow as soon as the river is free from such obstacles.

LARGE JAPANESE ORDER FOR KRUPPS.—The Kawasaki Dockyard Company has now been rehabilitated. The company intends to enlarge its rolling-mill output to 330,000 tons per annum, and has given the Krupp Company an order for a new mill turning out 200,000 tons of rolled products per annum involving the contract sum of Y.800,000 (about £80,000).

PROJECTED CONSTRUCTION IN SHANGHAI.—Many important building projects are contemplated in Shanghai, China, according to Trade Commissioner A. Viola Smith, Shanghai. These include a seven-story apartment house, a six-story office building, two blocks of shops, three modern hotels, two hospitals, a club house, two motion-picture theaters, a seven-story godown, and a Chinese Y. M. C. A. building. Details are available under reference Shanghai No. 66799.

NEW SUGAR FACTORY IN EAST JAVA.—A new sugar factory is to be erected at Ngoenost (East Java), according to Trade Commissioner Thomas C. Barringer, Batavia. Near-by lands will be rented for the period of 21 years and will be planted with sugar cane. A new bridge is also to be built at a cost of 500,000 guilders (\$201,000 at par value of guilder). The regent, the assistant resident, and a number of engineers have gone to the proposed site to acquire the necessary lands. The name of the firm which is behind this project is available under reference Java No. 66741.

TOKYO SUBWAY.—The Tokyo Subway Company has signed a contract with Shimizu-gumi for the construction of a subway between Mansei-bashi and Imagawabashi, a distance of half a mile, as the third phase of its extension. The construction work is scheduled to begin immediately upon the completion of the second extension which is now under construction. It is to be completed before the end of next year.

The second extension covers a distance of one mile between the Ueno terminal of the existing subway and Mansei-bashi. The construction of the first half of this extension from Ueno to Suehiro-cho will be completed in December and opened to service before the end of this year. The other half up to Mansei-bashi will be completed and put into service in March next year. At the end of this year, Tokyo will have one and a half miles of sub-ways, the first in the Orient.

When the second period of extension is fully completed to Mansei-bashi in next March, the company will install 20 more cars to meet increased demands of service.

DEVELOPMENT PROMOTION IN KWEI-CHOW.—The following are the Government enterprises in Kweichow province for promotion and development of agriculture and industry: (1) One experiment farm, with agriculture and sericulture departments. The results of experiments are published in the "Ten Day Periodical" and the "Agricultural Notes," for circulation among the farmers. (2) One sericulture experiment school has two classes for girls, with silk spinning and silkworm egg preparation departments, the latter supplying the whole province with "egg sheets" prepared by scientific method. (3) An afforestation bureau takes charge of re-afforesting waste land and denuded hills. There are also three stock breeding farms. An industrial office has been established in each *hsien* district to encourage industrial development. Kweichow authorities recently circularized the *hsien* magistrates to urge the people to plant lacquer and wood oil trees, for which both the soil and climate of the province are particularly suitable.

TO BUILD CANTON-HANKOW RAILWAY.—The Association for expediting the construction of the Canton-Hankow Railway recently proposed to use the salt gabelle of the Hunan province to build the Hunan-Canton section of the Canton-Hankow Railway.

KYORITSU MOUSSELANE CO., LTD.—This company is planning to instal two sets of woollen combing equipment at its Totebayashi Mill, in Gunma prefecture. The present equipment of this mill consists of 16,000 woollen spindles, and 500 looms. The looms are to be dismantled for sale. It is reported that the company has just closed a contract for the sale of these looms and the plan to instal woollen combing equipment is expected to materialize in the near future.

COTTON SPINNING INDUSTRY IN JAPAN.—Spindles installed in the mills of the members of the Japan Cotton Spinners' Association, as of August 1, 1928, numbered 6,116,714. Of this 191,642 spindles were of Toyo Mosurin and Tokyo Mosurin Boshoku which have just joined the Association, the balance of 5,925,072 spindles being of old members. Compared with June, 1927, just after the production limitation was enforced, this was an increase of 393,300 spindles. New members, other than the above two, enlisted since June last year showed some 100,000 spindles, deducting which the net increase was about 300,000. Estimating natural increase at 200,000 spindles, the balance of some 100,000 spindles may be regarded as extensions for the abolition of night work.

Extensions now being planned include the following: Wakayama Boshoku 5,700 spindles, Wakayama Senko 800 spindles, Otsumi Boseki 4,800 spindles, Kanegafuchi Boseki's Hyogo Mill 20,000 spindles, Fuji Gasu Boseki's Kitayama Mill 1,400 spindles doublers. Companies which are planning or carrying on extensions but details are unavailable, include: Osaka Godo Boseki's Akaho Mill, Toyo Boseki's Ichinomiya Mill, Kanegafuchi Boseki's Saidaiji Mill, Kikui Boseki's Ostaka Mill, Nisshin Boseki's Gamagori Mill, etc.

Cotton spinners estimated the net decrease of labor after the abolition of night work, originally at 20 per cent., now at 15 per cent., showing a difference of 5 per cent. The majority of companies are trying to make up the decrease in labor and profit by increasing production, but in case the production limitation should be still necessary after July next year, they will encounter more or less difficulties, as the operating hours will decrease in addition to limitation of output (though operating efficiency will no doubt increase). Under the circumstances, some people are fearing for excessive extensions of equipment. Members of the Association who had more than 50,000 spindles, on August 1, were as follows: (Exclusive of Toyo Mosurin and Tokyo Mosurin).

Company	Compared with	
	August 1, 1928	June 1, 1927
	Spindles	Spindles
Toyo Boseki ..	729,960	—
Dai Nihon Boseki ..	702,688	28,944 Increase
Kanegafuchi Boseki ..	562,416	8,308 "
Fuji Gasu Boseki ..	502,104	12,672 "
Nisshin Boseki ..	390,848	43,960 "
Osaka Godo Boseki ..	387,104	18,800 "
Kuraskiki Boseki ..	277,052	806 "
Fukushima Boseki ..	219,204	13,660 "
Kishiwada Boseki ..	203,892	13,100 "
Nagasaki Boshoku ..	109,856	2,280 "
Wakayama Boshoku ..	126,472	30,440 "
Kinka Boseki ..	125,292	32,736 "
Osaka Meriyasu Boshoku ..	91,124	22,800 "
Nagoya Boseki ..	85,584	—
Hinode Boshoku ..	83,864	—
Idzumo Seishoku ..	68,448	31,552 "
Izumi Boseki ..	66,752	—
Tenma Orimono ..	65,792	832 "
Kiyo Shokufu ..	65,332	—
Hattori Shoten ..	64,136	10,808 "
Sagami Boseki ..	63,280	—
Kikui Boseki ..	62,428	22,060 "
Omi Hanpu ..	57,808	—
Toyoda Boshoku ..	57,424	—
Meiji Boshoku ..	51,032	—
Utsumi Boseki ..	38,704(?)	19,880 "

EXTENSION PLANS IN JAPAN.—Denki Kagaku Kogyo is planning for extensions: to increase the present productive capacity of 100,000 tons a year to 200,000 tons. It is constructing a new power station in Miyazaki Prefecture, known as the Dai Ni Oyodogawa, capacity 25,000 k.w., to be completed before the end of 1930. Power from this plant is to be used at the Omuta Mill. Also Dai Roku Himekawa Power Station, located in Niigata, capacity 24,000 k.w., now under construction, will be completed in 1931, when the power is to be sent to Omi Mill in the vicinity.

Nihon Chisso Hiryo is carrying on extensions at Nobeoka Mill in Miyazaki Prefecture, Kyushu, and at Mizumata Mill in Kumamoto Prefecture. The Chosen Chisso Hiryo K.K. which is a sister company of Nihon Chisso, expects to manufacture 70,000 tons in 1930, and 200,000 tons in 1932.

Hokuyetsu Suiden (Hokuyetsu Hydro-Electric Power Co., Ltd.) is also planning to double its capacity of 5,000 tons a year to 10,000 tons by 1932. Daido Hiryo, which is a subsidiary of Daido Denryoku K.K., is to change its method of manufacture of Monsensu (phonetic) and increase the capacity from the present 6,000 tons to five times, 30,000 tons a year by 1932.

Production of Mitsui Kozan, Kamaishi Kozan and Nippon Seikojo (all of the same interests, Mitsui) which amounts to 5,500 to 5,600 tons a year, will be increased to 30,000 tons by 1929 by adopting Claude's process, and in 1932 to more than 100,000 tons.

Dai Nihon Jinzo Hiryo K.K. (Dai Nihon Artificial Fertilizer Co., Ltd.) has just completed the construction of Toyama Mill which is to be devoted to the manufacture of ammonium sulphate by Fouzer (?) process. It expects to manufacture 10,000 tons this year, 25,000 tons next year and 50,000 tons in 1932.

In 1930 the South Manchuria Railway Company will be producing 100,000 tons by Monsensu (phonetic) process, in addition to the present by-production.

Added to the above companies which are operating, a new big company is being promoted by Saburosuke Suzuki of Toshin Denki K.K. (Toshin Electric Co., Ltd.), in co-operation with the Tokyo Dento K.K. and Daido Denryoku K.K. The new concern is to be known as the Showa Chisso Hiryo K.K. (Showa Nitrogen Fertilizer Co., Ltd.), capitalized at Y.10,000,000. The plan is to manufacture 100,000 tons of sulphate of ammonia by 1932; power to be bought from Tokyo Dento, 50,000 k.w. at 0.6 sen per k.w.h. during April/October and 0.9 sen during November/May when water flow is low, contract good for ten years.

The total productive capacity of these concerns in 1932 will be some 972,200 tons, about four times the actual production last year. Toyo Seitetsu (Oriental Iron Mfg) and Taiwan Denryoku (Formosa Electric Power) are also planning to enter this field of activity, but it will be some years before their plans materializes.

Consumption of this fertilizer has been increasing steadily during the last few years. In 1923 the total in Japan (exclusive of Korea and Formosa) showed an increase of 30 per cent. over the preceding year, being 240,000 tons. In 1924 the total was 260,000 to 270,000 tons, an increase of some 10 per cent. The rate of increase in 1925 was more than 20 per cent., that in 1926 30 per cent. Consumption in 1927 decreased slightly, due to financial panic which occurred in the spring. Supply during the first half of this year amounted to about 320,000 tons, including domestic production of 140,000 tons and imports of 177,000 tons. Compared with 240,000 to 250,000 tons in 1926, this was an increase of 70 to 80 thousand tons or some 30 per cent. For actual consumption, some discount must be made, but it is certain that a considerable rate of increase will be maintained in the future.

Estimating the average increase at around 10 per cent. a year, the total consumption in Japan in 1932 will be 650,000 tons. Consumption in Formosa this year is estimated at 98,000 tons, an increase of 20 per cent. over last year; that in Korea 55,000 tons or an increase of 36 per cent. over last year. At the rates given consumption in Formosa will be 200,000 tons in 1932, that in Korea 150,000 tons, total 350,000 tons. Added to that in Japan, total 1,000,000 tons.

SHANGHAI-HANGCHOW BUSES.—The bus line connecting Shanghai and Hangchow via Haining, Pinhu, Haiyien, and Minghong is practically completed.

NEW 'PHONE LINE IN KWANGTUNG.—A long-distance telephone line in the northern part of Kwangtung province via Lohchang, Shaokwan and Pingshih is near completion.

MOTOR BUS SERVICE FOR KAOYU, KIANGSU.—A regular motor bus service is operating between Kaoyu and Paoyin, Kiangsu province, on a newly built motor road about 120 li long.

NAIGAI WATA, (Naigai Cotton Co., Ltd.), To Electrify Mills.—This company has plans to electrify its mills, to replace steam boilers. For the purpose about 20 motors will be bought, capacity ranging from 5 h.p. to 175 h.p.

NEW BUS COMPANY OF SOOCHOW.—A bus company for Soochow has been organized and has petitioned the local authorities for license to conduct a bus service. It has offered \$30,000 for road improvement. The company has been promoted by Yen Hsin-fang.

NEW MILL; Kikui Spinning Co., Ltd.—The company has decided to increase its capital from Y.4,000,000 to Y.6,000,000. The funds will be used for the construction of Otaka Mill in Mikawa, and for extensions at the Yoneno Mill. The first call on new shares will be made on November 1, at the rate of Y.12.50 a share on 40,000 shares. (This is also a subsidiary of Toyo Menko K.K. controlled by Mitsui interests).

HONAN MOTOR ROAD.—By instructions from General Feng Yu-hsiang, a motor road connecting Lingpao with Tungkwan, Shensi province, will be constructed. It has been decided to employ a number of surveyors to map out the exact course of the road and ascertain the approximate amount of money needed to purchase the land from the farmers. According to an estimate of the Highway Commission, the construction will cost \$370,000.

HAMURO CAST STEEL WORKS.—The Hamuro Chukojo of Osaka is planning to manufacture of special steels. At present there are only a few concerns in Japan manufacturing special steels, including the Yawata Iron Works, Nippon Tokushuko Goshi Kaisha and Ohana Kogu K.K.; the greater part of the country's requirements being imported. It is reported that estimates for the necessary equipment have been given and the plan is likely to materialize before long. This concern is located at 252, 1-chome, Tonmabashi Nishi Suji, Kita Ku, Osaka.

MUSASHI CENTRAL ELECTRIC RAILWAY CO., LTD.—Preparations are being made for establishing a new electric railway company, to be known by the above name. Promoters include Raita Fujiyama, Takamasa Ogura, Takaroku Yamanari, Gunshiro Mechizuki, Seiichi Kajima, Chokuro Kadono, Mr. Fujiyama being the chairman of the organization committee. The company is to be capitalized at Y.7,000,000. It expects to buy the Hachioji Denki Tetsudo K.K. (Hachioji Electric Railway Co., Ltd.), capitalized at Y.1,000,000, and in addition will construct new lines from Tachikawa, to Omiya via Tekorozawa, 32 miles.

PEIPING-TIENTSIN CANAL TO BE DEEPENED.—To relieve traffic congestion on the Peiping-Tientsin section of the Peking-Mukden Railway, Peiping (Peking) authorities are making plans to deepen the canal between Peiping and Tientsin so as to make it navigable to steam launches and heavy laden junks.

AUTOMATIC LOOMS, JAPAN SPINNING CO.—The (Japan Spinning Co., Ltd.) will remove the existing weaving equipment of the Ogaki Mill (in Gifu Prefecture)—consisting of 2,000 looms—to the company's Tsingtau Mill, replacing it by 2,000 units of the new Nogami's automatic looms. The company is also considering extensions of the automatic loom equipment at the Ichinomiya Mill.

SPINNING COMPANIES IN CHINA.—According to a recent investigation, there are 92 spinning companies in China, of which 73 companies are operated by Chinese interests (2,096,000 spindles), 21 companies by Japanese (1,392,000 spindles), and two companies by British (205,000 spindles), total number of spindles being 3,693,000. The number of operatives in Chinese companies is 134,700, that in Japanese companies 80,700, and in British companies 16,500, total 231,900.

ALUMINUM ALLOY FOR ENGINE MATERIAL.—The consumption of aluminum in Japan is steadily increasing and researches are being made for using (aluminum) alloy for manufacturing motor cars, launches, torpedo boats and other high speed vessels and locomotives. The Niigata Engineering Works, Ltd.—has succeeded in producing a motive power unit of 150 h.p. by using light alloy. The weight of this new machine is reduced to four tons from the usual nine tons.

TAIHEI CEMENT CO., LTD.—Preparations are being made for the establishment of this company, with a capital of Y.5,000,000. Of the total number of shares, 100,000, 80 thousand will be allocated among promoters and their friends and the balance of 20 thousand for public subscription. According to the prospectus the mill will be constructed at Tokura, in Oita Prefecture, Kyushu, at an estimated cost of Y.2,000,000. The company will specialize in high class cement. The cost of production is estimated at Y.2.10 per barrel, which is comparatively low, as the lime mine is located near the mill site. The company expects to manufacture 840,000 barrels, on which a profit of Y.804,000 is estimated: Income, Y.3,108,000 at Y.3.70 a barrel; expenditure Y.2,304,000 including depreciation.

LARGE EXPANSION OF MANUFACTURING UNITS FORECASTED.—Filipino and American capital is to be expended in the capitalization of some 16 new centrals which will be scattered throughout the sugar districts of the islands. This will be a fairly large boost to the sugar industry of the Philippines and will provide work for a large number of native people and will utilize areas suitable for cane production. A report recently issued by the bureau of commerce and industry states that the new centrals will have a daily capacity averaging 500 to 2,000 tons of cane per unit. Seven of the new plants are to be erected on the island of Luzon; five in the central provinces and two in the Ilocos province. In the Visayan Islands three will be built on the island of Panay. Two units will be erected on the island of Negros and one on the island of Mindanao.

The Pampanga Sugar Mill, probably the largest sugar central now in operation in the Philippines is being improved so as to increase its capacity to about 4,000 tons of cane; present capacity is around 3,000 tons of cane per day. In addition it is rumored that plans are under way for the erection of a 200-ton mill at Iloilo.

TWAKI SEASIDE TRAMWAY CO., LTD.—This company is planning the electrification of its tramway lines, four miles between Konahama and Izumi to be the first section to be electrified. The cost is estimated at Y.250,000. The section between Ena and Konahama will be electrified on completion of the first section. It is reported that Kuhara Shoji K.K. (Kuhara Trading Co., Ltd.)—a subsidiary of Kuhara Kogyo—will back the scheme. At present this company is operating gasoline locomotives. Office: Konahama Machi, Ishiki Gun, Fukushima Prefecture.

NEW RAILWAYS IN NORTH MANCHURIA.—Three new railways are projected for North Manchuria. The first is 540 li long, from Tungping to Mishan, passing Fangcheng, Muling and Poli. Construction will take two years and the cost is estimated at \$25,000,000. The second starts from Hailin a station on the C.E.R., and terminates at Tungkingcheng, a distance of 150 li. Work has already been started, the capital of \$1,500,000 being jointly supplied by the people of Hailin and Tungkingcheng. Construction will take one and a half years. As the completion of this line will greatly increase its business, the C.E.R. has consented to supply materials and rails at a very low cost. The third railway is entirely financed by the people of Keilungkiang province, and is the 250 li line from Tsitsihar to Koshan, estimated to cost \$5,000,000. There will be 12 stations each 21 li apart. Construction will take about two years.

WATER POWER DEVELOPMENT PLANNED IN KARAFUTO.—Development of hydro-electric power is being planned on the west coast of Karafuto by a Madame Chiyo Yamaguchi who is the president of the Nanka Takushoku K.K. (South Karafuto Development Co., Ltd.) and of the Karafuto Yodo Goshi Kaisha. The plan is to utilize water of the Hishitoma and To-futsu Rivers, to generate 500 k.w. at the former and 2,200 k.w. at the latter points.

The new company to be established will be capitalized at Y.5,000,000 and will be known as the Karafuto Suiryoku Denki K.K. (Karafuto Hydro-Electric Co., Ltd.) On the west coast of Karafuto the rate of charges for electric light and power is extremely high. The only supplier in this district, the Hokkai Suiryoku Denki K.K. (Hokkai Hydro-Electric Co., Ltd.) is buying surplus power from the steam power station of the Karafuto Kogyo K.K. (paper manufacturers) and is charging Y.1.20 to 1.30 per light of 10 candle power. Promoters of the company believe that the cost of power generation will be 4 sen a k.w.h., compared with 6 sen sales price of Karafuto Kogyo.

This is the first water power development ever planned in Karafuto.

SUPPLY ELECTRIC POWER TO PORT ARTHUR.—The plan to transmit electric power from Dairen to Port Arthur requires the total costs of Y.400,000 comprising Y.300,000 for constructing the transmitting lines, Y.60,000 for building the transforming station at Port Arthur, and Y.40,000, for the alteration of the Lungwangtang transforming station and the equipments of the Port Arthur station.

The above appropriation has been asked for in next year's Kwantung Government Budget.

The present transforming station, Port Arthur, stands in need of an additional generator of 1,500 kilowatts at the outlay of Y.130,000 to reinforce the existing one in the course of a few years, not to say of a positive inadequacy of the power capacity, as matters stand, to meet further domestic needs other than lighting, and irrigation, drainage, and rice cleaning, and other wants.

Besides, the existing generator will have to be supplanted with a new one that will cost Y.120,000.

In the face of all these, the idea to obtain the entire supply from Dairen has been mooted as far safer and more dependable even at the outlay of Y.400,000 as stated at the outset. The public at large is in favor of this plan.

Cable Address:
"IWASAKISAL-
TOKYO"



Code Used :
A. 1., A.B.C. 5th, Western
Union, Bentley's Complete
Phrase

MITSUBISHI SHOJI KAISHA, LTD.

(MITSUBISHI TRADING CO., LTD.)

Capital, fully paid-up - - - Y. 15,000,000

Head Office:
MARUNOUCHI, TOKYO.

Importers and Exporters, Manufacturers,
Commission Merchants, Brokers, Ship
Owners.

EXPORTING:

Coal, Copper and all Other Descriptions of Metals, Minerals and
Cereals, Chemicals, Oil, Paper, Glass, Canned Fish, Silk Goods,
and General Oriental Products and Merchandise

IMPORTING:

Iron, Steel, Machinery, Machine Tools, Chemicals, and General
Merchandise

ANNUAL PRODUCTION:

Electrolytic Copper Ingots	20,000	Tons
Pig Iron	100,000	"
Steel	50,000	"
Coal	3,500,000	"

COLLIERIES:

Takashima, Ochi, Yoshinotani, Kishidake, Namazuta, Shinnew,
Hojo, Kanada, Kamiyamada, Ashibetsu, Bibai, O-Yubari,
and Sakito

BRANCHES and AGENCIES:

Tokyo, Yokohama, Nagoya, Osaka, Kobe, Moji, Wakamatsu,
Karatsu, Nagasaki, Otaru, Tsuruga, Kure, Muroran, Hakodate,
Kushiro, Vladivostok, Dairen, Kirin, Harbin, Peking, Shanghai,
Hankow, Hongkong, Canton, Tientsin, Tsingtao, Tsinan,
Singapore, London, Paris, Lyon, Marseilles, Berlin, New York,
Seattle

STEAMSHIP DEPARTMENT—KOBE

Fleet Owned	25,000	Tons	Gross
Chartered Steamers	12,000	"	"

Regular and Irregular Routes between home ports and Chinese
and South Sea Islands Ports, etc.



MIIKE COAL

The Finest Steaming and Bunker Coals of the Far East
are mined from the famed Miike, Tagawa, Yamano
Sunakawa and Kawakami Collieries operated by the

MITSUI MINING COMPANY, LTD.

HEAD OFFICE:

No. 1 Surugacho, Nihonbashi Ku,
TOKYO, JAPAN

Capital - - - Yen 100,000,000

Annual Coal Output is equal to one-quarter of Total
Japanese Mines.

LEAD, SILVER, GOLD, ZINC,
COPPER, SPELTER, SULPHUR,
COKE, IRON, CHEMICALS
and DYES

Are produced from the Company's, KAMIOKA,
Lead, Silver and Zinc Mine; SANO, Copper and
Zinc Mine; KUSHIKINO, Gold Mine; KONGO,
Tungsten Mine; IWAONOBORI, Sulphur and Metal
Mine; Zinc Plants, Coke, Dyestuffs and By-products
Establishments in Miike.

Sole Agents for our Products:

MITSUI BUSSAN KAISHA, Ltd.
(MITSUI & Co., Ltd.)

Tokyo, London, New York, Shanghai, Hongkong, and
other Principal Commercial Centres of the World.

NEW MILL; Toyoda Spinning & Weaving Co., Ltd.—This company will erect a new mill at Kariya Machi, in Aichi Prefecture. This is the beginning of a big scheme backed by the Toyo Menka K.K. to establish a complete system from spinning to finishing. In future mills will be constructed at Nagoya, Hamamatsu, Shidzuoka and other parts on the Tokaido.

NEW EQUIPMENT FOR JAPAN'S TEXTILE MILLS.—A substantial expansion in the amount of business passing in Japan in textile machinery can be expected in the near future. It is now only a matter of months before the prohibition of night work for females and juveniles comes into force, and the realization is growing throughout the country that if the national output of cotton goods is to be maintained at its present level, considerable increases will have to be made in the equipment of the majority of the spinning mills. At a rough estimate, there are 5,000,000 spindles working in Japan to-day, and it can be said with more than ordinary confidence that an increase of about 25 per cent. in this number will be necessary.

Owing to the recently depressed state of industry and trade generally in Japan, the granting of credits in respect of textile machinery and other goods must be a matter for careful consideration. But, on the other hand, although the textile industry has suffered, the heavy financial reserves built up by the leading spinning concerns during the prosperous times of a few years ago have not been drawn upon to any large extent. They are, therefore, available for the purchasing of new plant, and in many cases are already being put to that use. In addition, it may be mentioned that the increase in the value of exports of textile machinery from Great Britain to Japan from £259,423 in the first five months of 1926 to £329,075 in the corresponding period of 1927, and again to £346,439 in the January-May period of the current year, indicates that British machinery is holding its own.

ROAD BUILDING IN SIUSAN COMMENCED.—In Siusan, an important city between Hangchow and Shaoshing, a new road, 65 li long, will be built. The work on the portion from Sihing to Chienching has already been commenced.

LONG-DISTANCE TELEPHONE LINES IN HUPEH.—The Bureau of Constructive Works of Hupeh has projected a plan for establishing long-distance telephone lines throughout the province. The whole system, 8,362 li long, is composed of seven main lines and 16 branches and it reaches 69 districts, 11 important towns and five forts.

GOODELL-PRATT COMPANY OF GREENFIELD, MASSACHUSETTS, have recently brought out a new Gauge which is sure to prove a fast seller for automotive use. This is called an Automotive Gauge. One end contains seven Feeler Leaves .0015, .002, .003, .004, .005, .010, .015 thick giving all thicknesses by half thousandths from .0015 to .0405 except .0025. The other end contains six S.A.E. Screw Pitches covering 1/4-28, 5/16-24, 3/8-24, 7/16-20, 1/2-20, 9/16-18, 5/8-18, 7/8-14 and 1"-14. This effectively covers the gauging requirements of any car.

Ten of these gauges are mounted on an attractive counter display card with these two very desirable features. The Gauges can not be removed too easily nor can they be touched nor handled until they have been removed.



SHIMONOSEKI TUNNEL.—From the results of investigations carried out over a period of years, the Department of Railways is convinced that the construction of a submarine railway tunnel between Shimonoseki and Moji is possible, and preparations are being made for the final design. The construction is to be started in 1930, to be completed in six years, and a budget of Y.20,000,000 is estimated for the first year. The plan is to drive steel pipes under the sea, as this method is easier and costs less than other methods now known. Tubes to be sunk will be 80 meters long and some 12 meters in diameter.

The "Export World" (founded 1898) is the monthly journal devoted to the expansion of International Trade. Write for a free specimen copy.

Bouverie House,
Fleet Street,
London, England

LEAGUE OF NATIONS

Publications of the International Labour Office

Among the recent REPORTS produced by the International Labour Office on industrial and labour questions, are :—

*MINIMUM WAGE FIXING MACHINERY :

A report describing the systems in force in different countries, together with a general study of the development of legislation on the subject, its objects, the bases for fixing minimum wages, the demarcation of trades and occupations and the methods of inspection and enforcement.—2s. 6d., or 60 cents.

*THE TRADE UNION MOVEMENT IN SOVIET RUSSIA :

After analysing the specific character of the trade union movement in Russia as conceived by the Communist Party, this report deals with the influence of trade unions on the economic and social life of the U.S.S.R. and on the trade union movement in its international aspect.—4s., or \$1.00

*SCIENTIFIC MANAGEMENT IN EUROPE : (by Paul Devinat)

After describing the origin and objects of his enquiry, the author, Mr. Devinat, who is the Director of the International Management Institute, reviews the growth and progress of the movement in favour of Scientific Management in Europe since the war, classifying the institutions for study and research in each country.

He surveys the general evolution of the movement and the practical results achieved, finally giving the opinions of specialists, technicians, industrial employers and workers with whom he was brought into touch during the enquiry.—4s., or \$1.00

*INDUSTRIAL RELATIONS IN THE UNITED STATES : (by H. B. Butler, C. B.)

This study is intended to give a concise and impartial view of the relations between employers and employed in the United States.

The facts stated are derived not only from documentary sources but also from information furnished by employers, managers of big establishments, engineers and labour leaders, during the author's visit to North America in the autumn of 1926.—2s. 6d., or 60 cents.

*Available in English, French or German.

Write for full catalogue, sent free on demand, to :—

INTERNATIONAL LABOUR OFFICE
GENEVA, Switzerland